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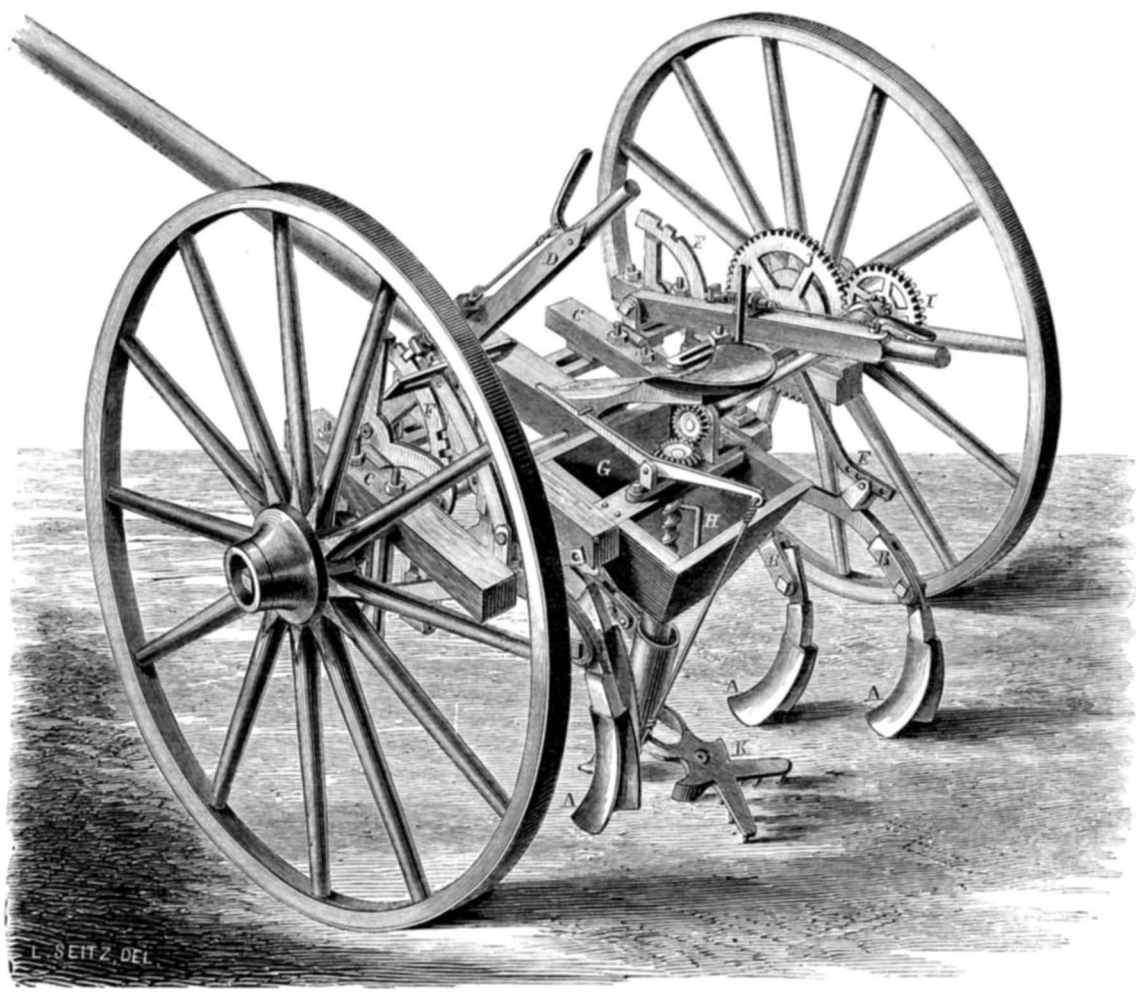
Improvement in Machines for Planting Cotton.

It is well known that even after passing through the gin, cotton seed have a considerable amount of the fiber attached, which tends to aggregate the seeds in masses and offers great impediments to their deposition in the ground in the manner employed for other seeds, which fall singly by their own gravity. Cotton must also be sown on a ridge, as standing water is injurious to the roots and stalk. A machine for planting cotton which will form the ridge as well as drop the seed is a desideratum. Such is the intention of that shown in the engraving. The frame is supported on the axles of the wheels, and the shares, A, are hung in pairs to curved arms by means of pivots passing through the upper part of the shares and the lower part of the arms, B. This allows the adjustment of the shares at any angle desired. The curved arms, B, are pivoted to downward projecting supports depending from the forward ends of the frame, and they are adjustable in hight by screw bolts, the nuts of which are seen at C. The whole is connected to the levers, D, by means of the straps, E. These levers are held to place, elevating the shares to any required hight, by a spring catch on the levers engaging with recesses on the quadrants, F. All the supports of the shares and their appurtenances are capable of being adjusted to form a ridge of any required width.

The seed delivery of the machine is probably the most important part of the device. The receptacle or hopper, G, is furnished with an upright shaft which projects downward to the delivery spout, its lower end being a spiral or worm similar to an auger. On the shaft are also two arms which revolve with it and serve to stir and keep the seeds separated. One is seen at H. By the aid of these appliances the quantity of seed delivered can be very accurately determined and their separation assured. The grade of the screw and its speed governs absolutely the amount of seed deposited in a given time. This upright shaft is driven by means of a horizontal shaft and two bevel gears, the outer end of the horizontal shaft gearing by the wheel, I, with the wheel, J, on the axle. Behind the delivery spout is the covering rake and scraper, K, intended to cover the seeds as they are dropped. The hight of his coverer is governed by means of a lever passing by the driver's seat, so as to be directly under his hand. An upright lever on the other side of the seat serves to connect and disconnect the feeding shaft at will by means of a sliding clutch, so that the machine may be used as a vehicle when passing to and from the place of labor. The feeding screw, by a suitable arrangement, may be made to operate in a horizontal position and more than one feed box may be employed to plant two or more rows at the same time.

Patented by Henry R. Fell and Edward Phifer, of Trenton, N. J., through the Scientific American Patent Agency, Nov. 20, 1866. For further particulars address as above, or Townsend & Co., No. 7 North st., Baltimore, Md., or No. 237 South Sixth st, Philadelphia, Pa.



FELL & PHIFER'S PATENT COTTON-SEED PLANTER.

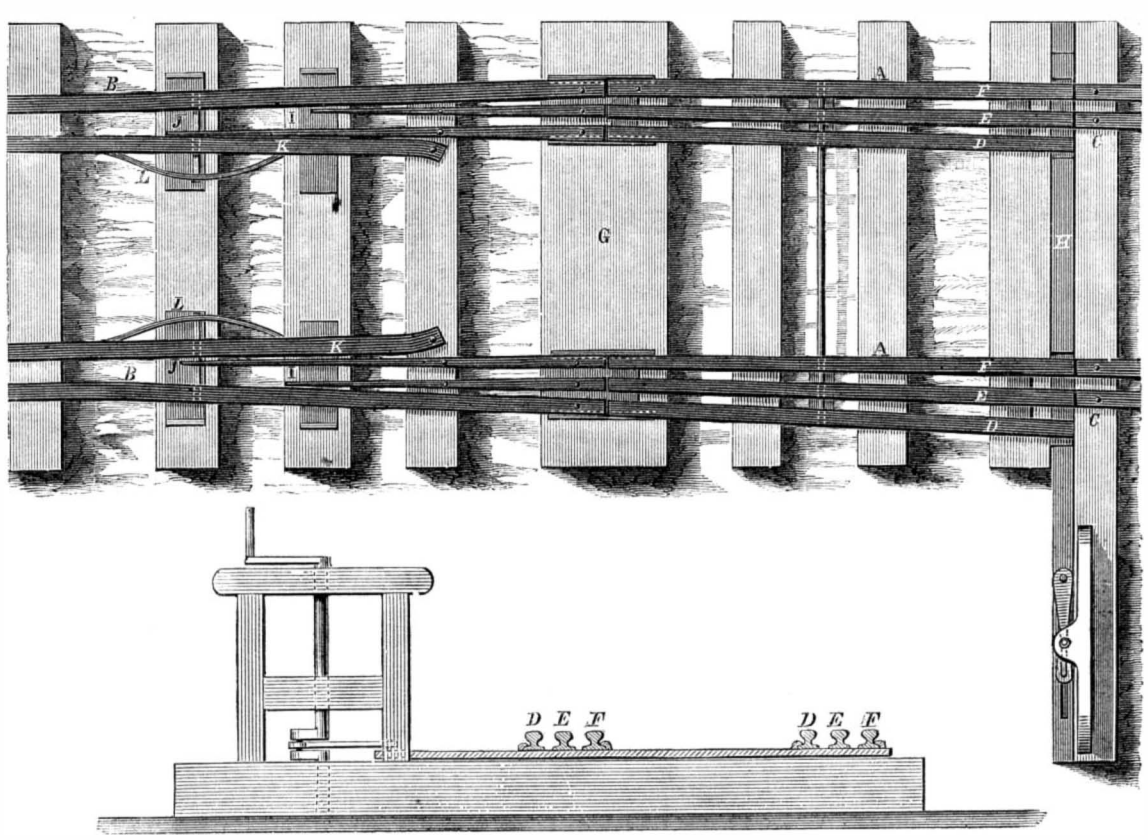
Railroad Safety Switch.

The fearful accidents from misplaced switches on railroads seem to demand something more reliable than the dependence on the constant care and attention of a switchman. The object of the device seen in the engraving is to furnish this means of safety. A and B represent the rails of a main track, while C shows the branch track of a siding. The switch is composed of three rails, D E F, at each side, which are nearly or quite parallel with each other and are pivoted or secured to a plate on the tie, G, in such a manner that they may work from a center, the opposite ends of the rails being fastened to a slide bar, H, which is moved by an ordinary crank switch.

The rails, B, of the main track adjoining the pivoted ends of the switch are curved slightly in a longitudinal direction and are in line with the outer rails of the switch, while the tongues, I and J, are in line with the rails, D, E, and F, of the switch. The tongues, I, are rigid, but the tongues, J, which are longer, are designed to yield laterally at their tapered ends, which are in contact with the guard rails, K, and the attenuated ends of I are in contact with the rails, B. The rails, B, are allowed to give laterally, having rods passing through them, the tongues, J, the guard rails, K, and the curved springs, L. The switch rails are secured at the proper distance apart near the slide bar, H, by blocks and keys.

The operation is as follows: When the central switch rails are in line with the main rails, A, a train may pass on the main track in either direction, the wheels when moving in one direction passing over the short tongues, upon the rails, B, and when moving in the other direction passing from these tongues upon the switch rails, E. When the switch is adjusted so that the rails, E, are in line with the siding or branch, C, the cars will pass from the latter upon the main rails in the same manner. In case the switch be left with its central rails in line with the siding and a train be running on the main track the wheels of the train will pass upon the rails denoted by C and E, the left-hand wheels passing upon the tongue, J, in line with it, the flanges of the wheels passing between the tongue and the opposite guard rail, and the right-hand wheels passing on to the right-hand rail of the main track. The flanges of the left-hand wheels press the long tongue laterally so that the wheels will be directed on the rails, B, the right-hand rail yielding to admit the passage of the flanges of the wheels on that side, and the curved spring bringing the rail to place after the wheels have passed.

From this explanation it will be seen that in no contingency can the wheels leave the track. This device has been practically and successfully tested. It was patented through the Scientific American Patent Agency Oct. 9, 1867. Address, for rights, etc., Thomas Fogg, St. Mary's, Canada West, or S. E. Martin, Assistant Superintendent Detroit and Port Huron Railroad, Port Huron, Mich.



FOGG'S PATENTED RAILROAD SWITCH.

A Suggestion for Theatrical Managers.

A correspondent from Washington, D. C., who chooses to be satirical, recommends an addition to our sensational and spectacular drama in the form of a boiler explosion. He says:

"Let the boiler be of the most improved kind, of about one hundred horse-power, with a water capacity of about a pint, supplied with all the modern automatic appliances which never require any attention from the engineer; such as water indicators where you never see the water; spring pressure gages which indicate ten pounds when the pressure is one hundred; gage cocks either choked or stuck so tight that the engineer considers it too much trouble to attempt to try the water by that means; the engineer, who has been either a shoemaker or tailor, sitting in a swing suspended from the safety valve lever waiting for the low water detector, which has an infusible plug, to give the alarm, which it does by a tremendous report, scattering fragments of the boiler, human bodies, houses, etc., in every direction; the whole to conclude with a coroner's inquest composed of the same material as the engineer, with the learned professors reading long essays on the mysterious causes (?) of boiler explosions. Introduced in the drama, the effect would be graphic."

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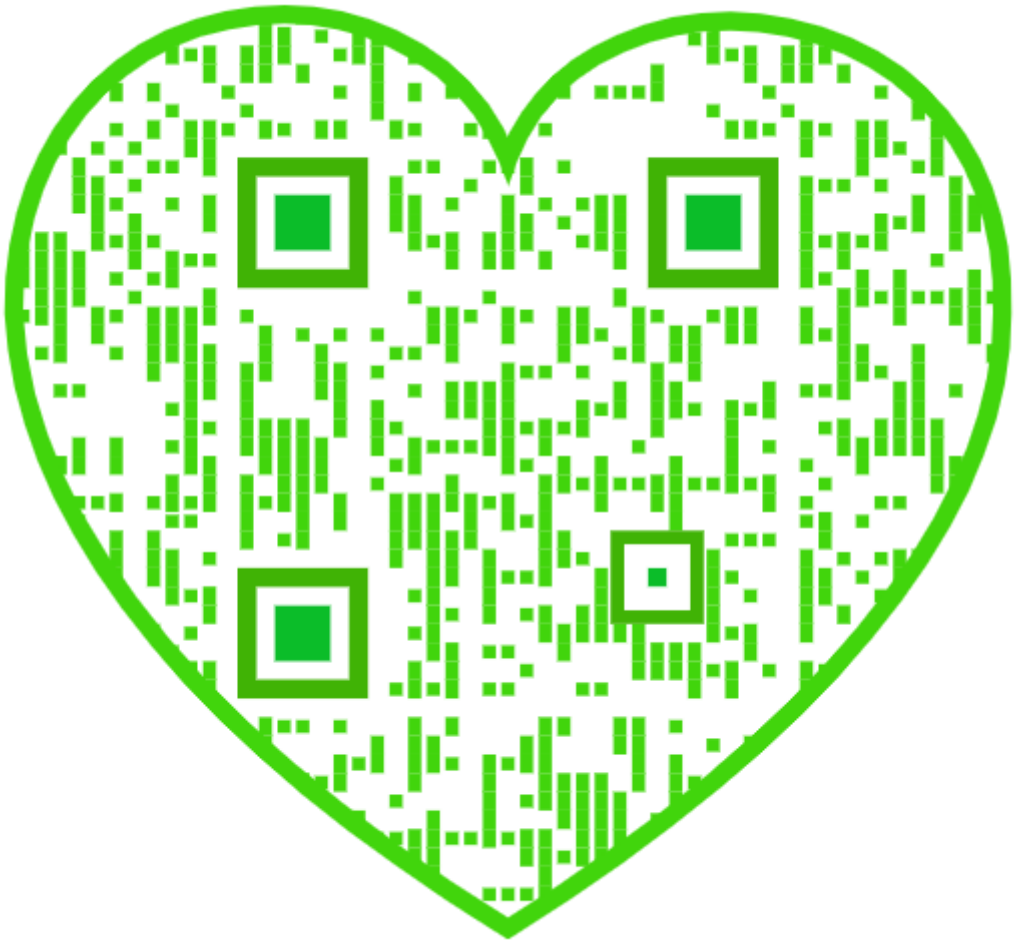

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

For the Scientific American.

EXPERIMENT IN OIL PUMPING.

I believe you are in the habit of answering questions of a scientific character, through the columns of your paper, especially such as are of general interest.

A few friends have urged upon me to state to you the results of some experiments I have made in pumping oil wells, with the conclusions I have arrived at, to know whether your views indorse me own as correct.

In the first place, I will state, that it has become a custom in the oil regions, in tubing a well, to place the seed bag in the second sand rock, which, in some cases, is 75, 100, 150, and 200 feet above the point at which the oil is struck. It has also become a custom to place the end of the pump or "working barrel," either at or above the vein or point where the oil flows into the well. And the prevailing opinion says, "Better 20 feet above the vein, than one foot below."

It is, also, very generally believed to be a fact, that all the water or oil is pumped out of a well from the seed bag down to the bottom of the "working barrel," no matter how far the seed bag is above that point, and whether the well is a gassy one or not. Some even insist that the suction is so great as to lift up the water in the space below the tubing or working barrel, clear from the bottom of the well, though it be a distance of 33 feet.

It is also a noticeable fact, that just as a well is about to cease pumping or discharging, or, as it is termed, about being "exhausted," that the walking-beam and machinery will shake or jar, as the sucker rods descend, to such an extent as to stop the evolutions of the engine, or break the sucker rods. It is then said, "The gas is working on her," and "she is now exhausted," and "the gas is holding up the valves so that they cannot act properly, and do any more sucking," etc. Now, as a rule, I have noticed this jarring of the "walking beam" to occur more surely and with greater force in wells that have but little gas, and pump more water than oil.

I made up my mind to test the matter, and see whether I could not prove that the prevailing practices and beliefs were all erroneous, and, if so, cause a better state of affairs to succeed them.

Now for the experiment. I selected a well which produced but little oil, not more than two barrels per day at the best, and which was not very gassy, but whose walking beam jarred fearfully when (as it was claimed) the gas commenced working. Mind you, there was but little gas to work—not near sufficient to make it an object to use it for fuel. The well was 475 feet deep and the oil was struck within a few feet of the bottom. I put in 460 feet of tubing and placed the seed bag 329 feet from the top, thus leaving 131 feet of tubing, including the working barrel, below the seed bag. When I had 131 feet of tubing in the well and ready to put on the seed bag I tied half-inch pipe alongside the tubing, so that the end of the half-inch pipe would just penetrate the seed bag and not extend more than a few inches below it, so that when the work of tubing was completed I had 460 feet of two-inch chamber and 329 feet of half-inch pipe in the well, one end of the half-inch pipe being just below the seed bag and the other end at the top of the well. After letting the well stand a sufficient length of time to allow of the swelling of the seed bag (over 48 hours to be certain the seed bag was tight), and first plugging up the mouth of the half-inch pipe with a plug, I commenced the operation of pumping; I pumped by "heads," as it is termed, every hour, until each head would produce a bucketfull or two of oil and the well got settled down into its regular old routine—that is to say, until every hour upon starting the engine it would throw a little oil at first, then a greater quantity of salt water, and then a better share of oil, until it quit throwing, and it was said the well was exhausted, or in other words pumped dry from the seed bag down to the mouth of the tubing—(my half-inch pipe all this while remained plugged). Now just as the well quit throwing and the jarring motion of the walking beam had ceased and had begun to run at an acceleratcd speed, was the time to try my experiment. (I have forgotten to mention that I had placed an elbow on the half-inch pipe and had run it up to a stream of water a short distance above the well and the end of the pipe was beneath the surface of the water and tightly plugged.) Without stopping the machinery, I ran up to the end of the half-inch pipe and screwed out the plug. The water immediately commenced running down the well—(the suction at the end of the pipe when I took the plug out was very great). In a very few seconds my walking beam went down with a jar, its speed decreased to what it had been before the well had stopped pumping oil, and, wonderful to relate, a splendid stream of oil came pouring from the tubing into the tank, and so continued until it had thrown a head—running steadily half the full of the tubing—three or four times as great as it had ever done before, until the oil became lighter and lighter in color, when finally nothing but pure fresh water took the place of the oil. I plugged up the end of my pipe again and waited until the well quit throwing entirely, then stopped my engine. In an hour, again started the engine, still keeping the water pipe plugged. The well then threw brackish water, and as soon as it ceased entirely and after the jarring of the walking beam, as usual, had also ceased, and it had begun to travel rapidly, I again took out the plug and let the fresh water run down. In a very few seconds the well again commenced throwing brackish water, and continued to do so until it gradually changed to pure oil, when about three buckets full were discharged; then it gradually changed until pure fresh water resulted. Now, the water below the seed bag, until the fresh water was introduced, was as salt as brine. I pumped this well for six weeks, varying the time for the heads, but always with precisely the same results. On several occasions, instead of letting water run down when the well would stop pumping, I would take the half-inch pipe out of the water, and withdrawing the plug, would let the air rush in; the well would resume throwing, but it would not last, only discharging a few additional buckets full, and on returning the pipe to the water, and letting it run down, the same result as before mentioned, *i. e.*, a much larger quantity of brackish water, then oil, and then pure fresh water.

The result of the experiment as above described I hold as conclusive proof that the pump does not exhaust the well of either water or oil from the seed bag down to the end of the tubing, and I will try to explain the reason.

I believe it is generally admitted that no ordinary pump can raise water from a horizontal to a perpendicular altitude, of over 33½ feet, because of the fact that a sufficient vacuum or amount of suction cannot be obtained. Now if you cannot create a sufficiently strong vacuum to suck water to a perpendicular altitude of say 35 feet, how can water be drawn away from a vacuum which must necessarily be formed in the well below a seed bag after an hour's pumping? I have said that when I unscrewed the plug in the half-inch pipe, the suction at the end of the pipe I found, by placing my finger against it, to be very great. The vacuum which had been formed below the seed bag was doubtless the cause of the suction at the end of the half-inch pipe from which I took the plug. As it was strong enough to hold my finger tight would it not hold the brass ball valve at the bottom of the working barrel tightly in its socket, so that the raising of the sucker rods a distance of two feet could not create sufficient suction to lift it, much less draw any more water or oil through it and away from the vacuum on the outside of the chambers below the seed bag?

Now I will suppose that upon the first pumping of my well after freshly seed bagging and tubing it, the water was pumped away from below the seed bag to a distance of 35 feet; I then let it stand one hour until this 35 feet was filled up again by salt water and oil flowing in below the seed bag—say that the salt water ran in seven times as fast as the oil—by the time the space was again filled up I had just five feet of oil. As the oil rises from the extreme bottom of the well and the vacuum became less influential, some of the oil in rising would find its way past the ball valve and into the tubing, rising to the top of the water there; this oil would be the first the well would discharge on resuming to pump, and after pumping out another 35 feet, and allowing another hour for it to fill up again to the seed bag, would give me just ten feet of oil in the well below the seed bag; and so on until I had pumped as many hours as 5 is the divisor of 131 feet, the entire distance from the seed bag to the mouth of the tubing. Thus you will see that it would take in round numbers 26 hours before the column of oil would reach down to the mouth of the tubing. Now it has just reached it, we'll suppose, and the well ceases to pump. We stop for an hour—30 feet of salt water runs in and 5 feet of oil. We resume pumping again; a little oil is the first result; that which settles on the surface of the water in the tubing; then 30 feet of salt water, then 5 feet of oil, and the well ceases to pump, quitting on oil. That which is in the chambers rises to the top as the well again fills up, 30 feet more of salt water runs in and 5 feet more of oil; and again a resumption of pumping produces the same result as last mentioned. Now comes the taking out of the plug in the half-inch pipe, and the rushing down of the fresh water. By keeping the engine going I pump out oil as fast as the fresh water is running in; the vacuum is thus partially retained, at least sufficient to keep the oil from rising to the top of the water, and I keep on pumping until I have pumped out 96 feet of oil and then comes the fresh water. I plug up my pipe again, and stop my machinery, having 96 feet of fresh water in the well, the top of the column being just 35 feet from the seed bag. Now as 30 feet of salt water and 5 feet of oil run in, in the course of another hour, that fresh water is made brackish, and starting to pump again the same programme may be gone through with.

I will now try to explain the cause of the jarring of the walking beam which is almost universally attributed to the action of gas. Any one who will take notice to the action of a walking beam when the jarring motion commences will notice that it takes place at some point while the sucker rods are descending; and at various points. Sometimes just as it starts on its descent; at others when half way down; and again when almost down. That the jar is caused, apparently, by meeting with an obstruction to its downward progress. Now gas is much lighter than air; and how is it possible that it could present such resistance to the downward plunge of the sucker rods as to impede their progress especially when it is taken into consideration that there is a ball valve on the end of the sucker rods which the gas, if in such great force, can lift and keep it raised sufficiently for its passage all the time the rods are in motion both up and down? Then what impedes the downward plunge of the rods? Six, eight twelve or eighteen inches of water or oil on the valve at the bottom of the working barrel will cause the jarring.

We will suppose the well to be just tubed, and the water filling the entire space from the seed bag down to the mouth of the tubing. We will also suppose that only 35 feet can be pumped out at a time. If the two feet the suckers separate inside of the working barrel, drawing through the lower valve (or sucker) just two feet of oil; is a perfect divisor into the space of 35 feet on the outside, below the seed bag; then, when the well is about to cease discharging, there will be no jarring motion of the walking-beam, and no breaking or strain upon the rods, and the engine will suddenly accelerate the motion of the beam. But supposing the two feet of oil or water which are drawn into the tubing at each stroke of the beam is not a perfect divisor, it follows, that, on the last stroke up, before the vacuum of 35 feet is completed, it draws through only ten inches (more or less) sufficient to complete the vacuum below the seed bag. The rods rise fourteen inches further, and when at their highest, start down, meeting with no resistance, till the sucker strikes the surface of the ten inches of water which rest on the lower valve, which latter is held tightly in its socket by the action of the 35 feet of vacuum just below the seed bag, and a concussion is the natural consequence. The sucker forces its way through this ten inches of water, picks it up, draws no more water or oil through the valve at the bottom of the working barrel, and on its next descent flies with an accelerated motion through two feet of space; and so the motion increases, and the steam is shut off. If the steam is not shut off, but the engine is allowed to continue at a rapid rate of speed until more water or oil runs into the well, and a few more inches are drawn through the lower valve, but not sufficient to fill the space of two feet, a breaking of the sucker rods on the downward plunge is almost inevitable.

When I have asked: Why do you prefer placing the mouth of your tubing 20 feet above the oil vein, rather than one foot below? I have received the answer; experience has proved it to be the best; more oil is obtained. But no one is able to explain why. Now, as I think I have proved that the pump does not pump out all the water from the seed bag down to its mouth, much less pump it from below its mouth, so as completely to exhaust the well, there must necessarily be a column of water always resting on the oil crevice. Can you explain how, therefore, experience has taught this to be the best?

I have also mentioned, that, during my experiments, I let air run in through the half-inch pipe instead of water, thinking that it would fill the vacuum, and thus enable me to pump out down to the mouth of my tubing. But it would not. I even tried the water on a cased well, which is open all the way from the top to the bottom, so as to admit the air freely; and, after exhausting it, that is, pumping till it ceased producing, on letting the water run down, produced a like result as with the half-inch pipe. Can you explain why the air did not answer the same purpose as the water? That is to say, why could I not continue to pump water so long as the mouth of my tubing and pump are below its surface, after relieving the vacuum below the seed bag, by admitting air? Yours, etc., R. M. Robinson.

Franklin, Pa., Nov. 1867.

The Glacial Epoch.

Messrs. Editors:—On page 341 current volume of the Scientific American Mr. Reid accounts for the glacier epoch by the precession of the equinoxes. Is this cause sufficient for the effect? Can it cover the whole nothern hemisphere with ice as far south as Washington and St. Louis, as in former times? He says that the extreme of cold of the Antarctic was reached in 1248, or 619 years ago, and that it takes 10,500 years to change the extreme point of cold from the southern to the northern hemisphere; and in 9,881 years from the present time the glacier epoch will be repeated in the northern hemisphere. If this cause was sufficient the time which has elapsed since 1248 is so small a portion of the whole time necessary for the change, that the southern hemisphere would still be comparatively near its point of extreme cold. We can go back several centuries but there was no glaciers there then more than at present. Cape Horn was first discovered in 1525, and Magellen passed through the straits bearing his name into the Pacific in the year 1520. These periods approach over 300 years nearer to the time of extreme cold in the south, or to the year 1248, but there is nothing to show that the climate there was any more severe then than it is at present. If the precession of the equinoxes were the cause Patagonia would now be an immense glacier—as it has been at some time—and the passage around Cape Horn would be as impracticable as the Northwest passage, I think, and even the Cape of Good Hope could not have been doubled by De Gama in 1497. The west coast of Patagonia between the mountains and the sea is heavily wooded and I venture to say that trees several hundred years old may be found there as far south as 50°. We have a very poor opinion of Patagonia but it is owing more to the desert character of its soil, east of the mountains, than to its climate. At Rio Negro latitude 41° south, cattle feed in the fields all winter there being plenty of vegetation and no use of hay; and they could not do any better than that at New York latitude 40° 42′ north, where the ground would be hid from them by ice and snow for weeks, and if there was any vegetation left they would require an iron-clad proboscis to reach it. Thousands of bullocks, sheep, and horses on the Falkland Islands latitude 51° S., are running wild over the country and find pasturage all through the winter and these islands also show the work of a glacier epoch as well as Patagonia.

We are able to go just as near to one pole as the other probably as far as temperature is concerned. There has been several systematic if not desperate attempts made to penetrate to the Arctic pole, but none of them have succeeded in getting further than 81° or 82° N., while ships have sailed nearly as far south, and we do not find that great difference of temperature that might be looked for if Mr. Reid's explanation of the cause of the glacier epoch were the true one. The English ships *Erebus* and *Terror*, the same that were lost with Sir John Franklin by being beset with ice at 70° N., had previously

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explored the Antarctic as far as 77° S., and might have gone further perhaps but were stopped by the land of the Antarctic continent. The Southern hemisphere has a more even temperature owing to its greater amount of water, and the same has been considered the reason why the thermal equator is north of the real equator, excepting in the middle Pacific. The greater amount of water south has probably cooled the crust of the earth to a greater depth there than at the north, and the internal heat of the earth has less influence on the surface there than here; at least the curving in the thermal equator seems to indicate that its location is influenced by the amount of land.

Say that the mean temperature of the Southern hemisphere is at present 6° Fah. below that of the Northern hemisphere, and that this difference of temperature is owing to the precession of the equinoxes; it will necessarily follow that in 8,262 years from this time the mean temperature of the Southern hemisphere will be 3° warmer and at the north 3° colder than at present, making the opposite state and conditions with the difference of 6° in temperature. Then it will require 8,262 years for the north to become 3° colder than it now is; but within the comparatively short space of 619 years following an extreme of cold must be reached which will cover up the country with icebergs as far south as Washington. And in 619 years after that the climate will be molified and the same as that of Patagonia at present; and we shall have trees several hundred years old also which must have grown up after the disappearance of the glaciers. Even if we should admit that a sufficient cold could be produced within the 619 years from that cause I think that geology shows that the drift period existed for a much longer time than was possible under these circumstances. The question is one of great interest in its bearings on other unexplained phenomena if not in itself. F. A. MORLEY.

Spouting Wells and Flowing Springs.

MESSRS. EDITORS:—On page 307, current volume of the SCIENTIFIC AMERICAN, I find an article under the above caption, signed by Mr. John Wise, of Lancaster, Pa., in which he states that the flowing of springs and wells is not always due to the hydrostatic pressure of the water in the fountains or reservoirs from which they flow; but that in case of springs on the plateaus of mountains, a more philosophical solution must be sought.

Now, with due deference to Mr. Wise's opinion, I must beg leave to differ widely with him on that subject; for I have visited several of these springs, said to be on the very pinnacle of mountains, and I never yet saw one that had not one or more acres of adjacent land, that, on a topographical survey, would be found to be from one to five feet higher than the spring, which, with an impervious sub-soil or rock foundation, as usually obtains on mountains, and an ordinary supply of rain, would be sufficient to produce a continuous flowing spring.

Mr. Wise's more philosophical solution is, to my mind, very unphilosophical; for if the centrifugal force of the earth's axial rotation is sufficient to so far overcome gravitation as to cause water to flow above its fountain level, why does it not prevent it from flowing down the mountain side after leaving the spring? or, rather, to flow still higher up the mountain, in case there was any higher land? It certainly should do this, on Mr. Wise's hypothesis. The fact is, that the centrifugal force of the earth's motion is just capable of raising the water of the equatorial regions to the present ocean level of those regions, which, by Mr. Wise's own admission, is about fourteen miles farther from the earth's center than at the poles, and can no more raise it one foot higher than it can cause water in a pail that is partially filled to flow out over its top when standing erect.

What Mr. Wise says concerning the sponge I consider irrelevant to this question, because its operation is, through capillary attraction, which is quite strong when the sponge is nearly exhausted of water, and weak when saturated.

B. BARKER.

River Falls, Wis.

The Waste of Fuel.

MESSRS. EDITORS:—I desire through your columns to ask for information upon a subject which although much discussed is not entirely clear to me. It is observed that when fresh fuel (coal or light fuel) is added to a furnace fire volumes of dense black smoke issue from the stack. Now what portion of the fuel is this that thus escapes. Again, why does this escape of smoke cease after a short time, although the fuel may not be nearly consumed? After adding dry shavings to a fire I have greatly reduced, in fact, almost prevented this escape of smoke by slightly opening the furnace door for a short time. I reasoned that when the fuel was first added the gases evolved were greater in quantity than the usual quantity of air could consume and the surplus, therefore, passed up the chimney. Now, by opening the doors so as to admit more air they are consumed and a greater amount of heat secured.

Now, if this view is correct, this dense smoke must be the gases, to evolve which from the fuel, heat has been abstracted from the furnace and then wasted. This subject seems to me to be of some importance, for if it is true that all this escape of smoke is a waste of fuel then the waste must be enormous in all of our large manufactories. W. B. C.

Richmond, Ind.

[The smoke is composed of unconsumed gases and the lighter particles of solid fuel—carbon. Admission of a sufficient supply of oxygen, or atmospheric air in a properly constructed furnace is the remedy. The subject is probably well understood by intelligent people.—EDS.

RAILWAY BRIDGES---THEIR MATERIAL AND MODE OF CONSTRUCTION.

Jervis in his "Railway Property" makes the following very just remarks on the bridges of railways which are particularly pertinent in view of the disasters occurring in various sections of the country from the insecurity of these structures. His directions and suggestions will be found to be valuable:

"In this country bridges are mostly constructed of wood; in England, brick is very extensively used, and in that mild climate may answer a good purpose. So long as bricks continue durable, they give similar stability to stone; but in the northern States of our country they cannot be recommended. In any situation where good building stone may be had, it admits a cheaper structure than brick; it has fewer joints and is less exposed to fracture. Timber is generally used for its cheapness, and the facility it affords for rapid construction. Such bridges are sometimes constructed with stone abutments and piers, but often with frame-work of the same materials. It cannot be denied that in many cases in this country, considerations of expense absolutely control this question, and leave the engineer no choice. It is nevertheless a matter of importance, both in regard to the permanent economy of a railway, and of its safety in use. Timber has only a moderate degree of durability, when exposed to the vicissitudes of our climate; and efforts for its preservation in bridges in this country have not been attended with any great success. Housing has proved very useful for bridges on common roads, but the danger of destruction from fire by locomotive engines renders this form of security on railways less desirable. If a bridge is covered, the inside that is exposed to fire from the engines should be kept well covered with a wash of lime and salt, as a protection of much value against fire. Covering the top with a decking has proved of doubtful utility, and many are now left to the free action of the elements.

The length of time timber will last in a bridge, especially an open one, is quite uncertain, and there is danger that it will be trusted too long for safety. The first decay will be in the interior of the scantling; this may be to a serious extent while all exposed to observation appears sound and safe. The traveller on the railway cannot examine the bridge—he must depend on the railway agent, under the proprietary interest in the question; and the agent may be satisfied with the exterior, or from other cause neglect the proper examination, until some train falls through, when it will be sadly certain that it should not have been trusted so long.

A large portion of the bridging that has been built with timber spans, might be made with stone arches not exceeding forty feet span, and many of these with less span. Where abutments of stone are made, as retaining walls for the bank, and to support the timber span, in such situations as allow sufficient hight for arching with stone, it will often be found that stone arches may be erected with small additional expense over the wooden structure, resting on stone abutments and piers. Arches for this purpose may be substantially made with a good quality of building stone and hydraulic cement at a moderate cost. Dressing stone to courses is not generally necessary for the permanence or stability of the work. Arches of unhewn stone, with proper spandrels, have been successfully built of seventy-five feet span, with rise of one-quarter, for the use of common roads. I would not recommend going to this extent without dressing the stone for a railway bridge, but there is not the least difficulty in carrying them to fifty feet with one quarter to one third rise according to quality of stone. When materials can be had that are suitable for abutments and piers, they can generally be found sufficient for the sheeting of an arch. In making arches of unhewn stone, a common error should be avoided—namely, dressing the ring or heading courses; which not settling with the rest of the arch, is very likely, in arches of considerable size, to split off and separate from the main body. This is mostly done for appearance, and is sadly at the expense of stability. The heading should be of the same workmanship as the body of the arch, giving it no more care than would be given to the face of an undressed wall.

There are comparatively few situations where arches of more than 50 feet are required, to provide sufficient opening for the water-way. If one arch is not enough, two or more may be provided. Small arches are less expensive for the span they provide than large ones; and hence it is often better to make two arches of equal aggregate span than one, to provide a given opening; and they require less hight. The size of the opening for water-way will depend much on the exposure to obstruction from drift-wood or ice; and it will require careful observation to settle this on a safe basis. It is not often serious on small streams; but for large streams, exposed to heavy floating ice and drift-wood, the safety of the structure will depend materially on the proper disposition of this question. The opening that may be necessary to give free passage to the water, is the first question to be considered in planning a bridge or culvert. It should be sufficient to pass any floating substance likely to be brought by the current to the bridge. On this point it is best to err on the safe side, in order to be prepared for that great flood, more weighty than any previously known by the oldest "inhabitant." A water-way barely adequate to pass a flood will severely try the foundation; and it should be kept in view, that occasionally—perhaps once in a quarter, or half a century—streams of water are swollen much beyond ordinary floods, and sweep off what had been regarded as well tried and safe. The water-way may require two or more spans to provide sufficient flow, but each should be wide enough to allow any ice or drift-wood that the stream may bring down to pass through freely, so as not to dam up and obstruct the flow of water. In regard to ice, if the stream directly above the bridge is rapid, the ice will be broken into small pieces, and pass off with little hazard of forming a dam at the bridge; or if it be very crooked and sluggish, the ice will be held in its original position, until it becomes too weak to cause much obstruction in passing the bridge. There are comparatively few streams that would not be safely secured against ice or drift-wood forming a dam, by spans of 50 or 60 feet; and if more is required to give sufficient water-way, the number of spans can be increased accordingly. If larger openings than 60 feet are required, and there be sufficient hight, stone bridges may be advantageously erected, but will require more expensive workmanship and materials.

The remarks in relation to the masonry of culverts are applicable to that required for bridges. For bridges of unhewn stone, the stone should be larger in proportion to the magnitude of the walls and the pressure they may be required to sustain. The judgement and experience of the engineer must decide, as to the pressure from the hight or span of the work required, how far he may with safety adopt rough or unhewn stone-work. So far as this can be done, it will be much more economical than hewn stone; and, as before remarked, it will be found in general that by far the greatest proportion of bridges may be constructed of unhewn stone, without sacrifice of any material stability. It sometimes happens that the stone quarries that must be resorted to will furnish stone in such shape, that it is little more expensive to make regular courses roughly hewn than rubble work, and in such cases it will be advisable to form courses of uniform thickness of stone for the more important features of the work.

Stone arch bridges require more hight, or space below the grade level, than timber; and it is to be considered whether or not this can be obtained without too much sacrifice in the cost of grading. It sometimes occurs that the formation of the approaching country, on which the line of railway is laid, is low in comparison with the bed of the valley or stream over which the bridge is required to be made, and the most favorable grade for the approach does not give space for the stream in time of floods under the bridge; and the expense of raising the grade will sometimes so control this question, as to lead to the adoption of timber or iron for the want of room for arching. The grade should be high enough to be beyond the reach of all floods in the stream, and a few feet additional is all that is necessary for arches of small span; and when this can be obtained at moderate additional cost for the filling, arches of stone should be provided for. In examining the circumstances of grade with a view of ascertaining what room may be had for arching the bridge or culvert, it will be kept in mind, that raising the grade will improve the facilities for drainage, a matter never to be lost sight of in the construction of a railway, and will always justify some expense to improve it, even when otherwise fair.

It must be conceded, however, that there are situations, where a railroad passes over a flat country, with shallow valleys for its streams, where timber or iron must be used for the spaces or spans between the abutments and piers, for the want of room to put in arches of stone; but the cases are not comparatively numerous in which this may not be avoided by a judicious management of the grade lines. Cheap construction in the outset will call for low grades in a flat country, but the true and permanent interest of the work requires them to be higher than they generally are, both in relation to passing streams with safety, and to give effective drainage. Low grades, and consequent imperfect drainage, have been a very prevalent error on the railway constructions of this country. The engineer should keep this in view, and avoid the error.

Iodine and Carbolic Acid.

The *Journal des Connaissance Médicales* publishes a letter addressed to Dr. Caffe on Dr. Percy Boulton's late discovery of the action of carbolic acid on iodine. "The inconvenience," says the writer, "attending the external application of iodine and its preparations is so serious that physicians are often compelled to abandon a remedy the therapeutic efficacy of which is undoubted, nay almost unequalled in *materia medica*. The great objection to the external use of this remedy is, that it leaves marks both on the linen and on the skin. This is a sufficient motive for seeking some means of getting rid of this drawback, especially in the case of ladies. Dr. Percy Boulton's method consists in adding a few drops of phenic (carbolic) acid to the iodine solution to be employed. This addition renders iodine perfectly colorless, so that it may be applied with impunity. But this combination has another advantage. It appears from that practitioner's observations, which I can confirm, that, so administered, carbolate of iodine, which is the new substance in question, is not only one of the most powerful antiseptics we possess, but is intrinsically a more efficacious agent than iodine alone. I have used this compound under the form of injections, gargles, and lotions, in all cases in which iodine is prescribed. In sore throat, ozæna, abscess in the ear, etc., this preparation is a sovereign remedy; since, besides its disinfecting qualities, it modifies the mucous membrane, causes all local sensibility to disappear, and cures the patient much sooner than if either of the two agents were employed separately. The formula I employ is as follows:—Compound tincture of iodine, 3 gms.; pure liquid carbolic acid, 6 drops; glycerine, 30 gms.; distilled water, 150 gms. The writer then enters more particularly into the properties of carbolic acid, but with which our readers are already acquainted. Its efficacy as a disinfecting agent in the case of sores is well known; it may be prescribed in all cases in which tar water is administered, and is, we trust, now pretty generally adopted for disinfecting purposes in hospitals and barracks.

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Science Familiarly Illustrated.

Natural Qualities and Peculiarities of Glass.

This material is as old as reliable history. The fable which ascribes its invention or discovery to the accidental fusion of an alkali with seashore sand by a fire made by shipwrecked Phœnician sailors is not worthy the degree of credence we usually yield to Pliny's relations. Glass beads and imitation gems have been found with Egyptian mummies which must have been interred over 3,000 years ago. In fact, at Thebes was discovered a glass bead of rare purity which had the name of a monarch inscribed upon it who lived 1,500 years before Christ. Glass lenses, bottles, and vases have been found in the ruins of Nineveh, and it is not improbable that glass was known long before it was manufactured into articles of use or ornament; for in the process of the reduction of metallic ores and in the baking of pottery the vitreous debris must have been noticed. According to Theophrastus the manufacture of glass was practiced 370 years B. C., and the processes of grinding, coloring, and gilding were then in use. Colored glass was used in church windows in the eighth century, and in the time of the crusades the art of ornamenting and decorating articles of glass was introduced from the East. Works were established at Murano, near Venice, and for a long period the Venetian glass was justly celebrated for its elegance. Many of the ornamented objects made in Venice have been lately reproduced; that known as the Venetian ball, so popular now for use as a paper weight, being an instance. They are made by combining pieces of colored glass to imitate flowers, etc., and introducing these into globes which are compressed or flattened upon the designs by the blower drawing in his breath and thus exhausting the air from the interior. The lens form of the envelope has the effect of magnifying the ornamental objects. Frosted glass is produced by dipping the hot glass, before blowing, into cold water, reheating it and blowing before the cracks on the exterior are closed by fusion. Probably the finest specimens of ornamented glass now made are those manufactured by the Bohemian peasantry. The cause of this excellence is partly the superiority of the materials existing in Bohemia and partly to the wonderful skill in manipulation attained by patient and constant practice.

Glass is a chemical combination of silica, potash, lead, lime, alumina, and other substances intended to produce silicates of these bases. The colors are produced by metallic oxides. The specific gravity of glass varies with its composition from 2·4 to 3·6. When cooled it is exceedingly brittle, but when softened by heat is very tenacious and may be molded at will. It can be drawn into threads of extreme tenuity, and in this form has been woven into silk, producing an elegant effect. These threads are quite elastic, as is also a solid globe; even hollow balls have been dropped upon an anvil from a hight of ten feet, when they would rebound to at least one-third of that hight without sustaining a fracture. This quality of elasticity when in the form of thread has lately given rise to the story of an attempt by a French chemist to unite masses of these elastic threads by partial fusion, with the object of producing a flexible glass. The project is too ridiculous to merit serious remark. When glass ceases to be brittle it will probably lose some of most valuable properties, which seem to be inseparable from this objectionable quality.

On The Manufacture of Malleable Castings as Practised in Europe.

The material generally employed in European founderies for the manufacture of malleable castings. is Scotch pig iron, which, however, must be free from sulphur and phosphorous. Though the brand of the pig is kept secret as much as possible, the writer has detected that the various shops are using different brands. The melting of the pig is performed in crucibles of plumbago, holding about sixty pounds each. They are covered with a lid of chamotte for the purpose of avoiding the falling in of coke, which by a subsequent removing would evidently cause a loss of heat. The hearth of the furnace is constructed of chamotte stone, and having a width of two or three feet square, is adapted but for four crucibles. Blast is not employed, it having been found that time is saved only at an expense of fuel, the natural draft through the flue being quite sufficient. We have it already noticed that the fused iron is cast into the forms at the highest obtainable heat; to recognize the same requires some experience, however. The workman knows that the charge is ready by simply dipping a red-hot iron rod into it, on the withdrawal of which a scintillation takes place. The crucibles are then lifted out from the furnace, and when the surface of the fluid mass is skimmed, the molding is commenced with. Small pieces, as keys, locks, and parts of sewing machines, are cast in sets with a common gate, from which they are detached again after cooling. In casting a larger and more complicated model, we have to examine beforehand where the so called *suckers* are to be formed in the sand; they form reservoirs, are filled in casting, and when the piece cools down it sinks from them. If this is obviated, cracks are produced at the spot where the molding of a sucker would have been necessary. Though these cracks are often so small that they cannot be perceived, they make their appearance when the casting has gone through the second process, which we will describe hereafter. Those reservoirs are made at the elbows of levers, at the edges of bent pieces, and wherever the dimensions vary rapidly; however, care is taken not to heat them off too soon, as the castings are exceedingly brittle unless thoroughly cooled.

The molding boxes are either set vertically or almost so, the former position always being used for smaller molds. Four or six of them are fastened together with clamps, and placed with the gate upwards. Molding is done very carefully, in order that the article obtain a smooth surface, and cleaning be possibly avoided after the "heating." This process is intended, as well known, to give to the castings all the properties of forgeable iron. The same consists in embedding the castings in hematite powder, and exposing them in cast iron boxes, called mufflers, to red heat for several days. Formerly founders were of the opinion that round mufflers were preferable to square ones, but now they employ square boxes of one inch iron, a cover being attached to them to protect their contents from the atmosphere. As to the heating oven, it is of simple construction, the fire gases being allowed to play around the boxes which are placed in the back part of the oven, a good fire is made at once, and after this packing is done in regular intervals. The castings are left inside for three, four, or five days, according to their size, and one oven is made to hold 700 to 900 lbs. The boxes with the large castings are exposed to the greatest heat, while those with the small ones are subjected to the lowest temperature. If it be thought that they are heated sufficiently, they are left to cool gradually, and after having been unpacked the castings are cleaned according to necessity.

REFFELT'S EDUCATIONAL APPARATUS.

The slate and blackboard are efficient aids to education; their usefulness being mainly based upon the fact that none of our senses are so sensitive or retentive as to details as that of vision. To see is to believe—to be convinced—an occular demonstration being one admitting of no reasonable doubt. For this reason "object lessons" have become a deservedly

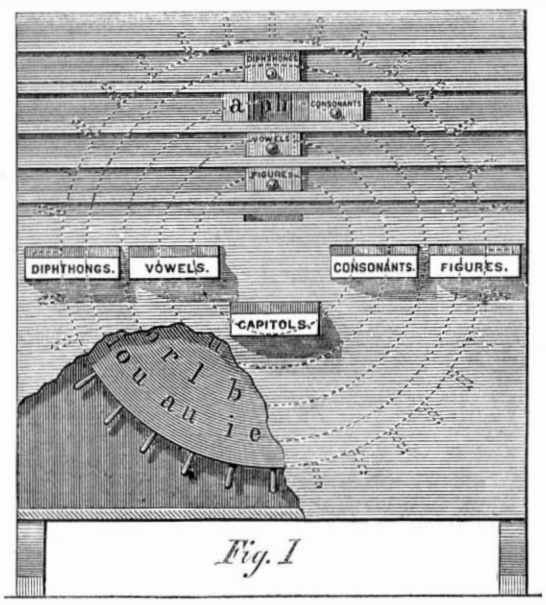

Fig. 1

favorite means of imparting instruction, and fulfill admirably the work demanded. The mechanic, even, however educated he may be, prefers always a model to a drawing or diagram; the work to be done being presented in every position, as well as in detail.

Acting on this principle, the inventor of the devices shown in the engravings accompanying this description has constructed convenient appliances for the school-room or the family, designed to facilitate the acquirement of the relation of numbers and the knowledge of the elements of a language.

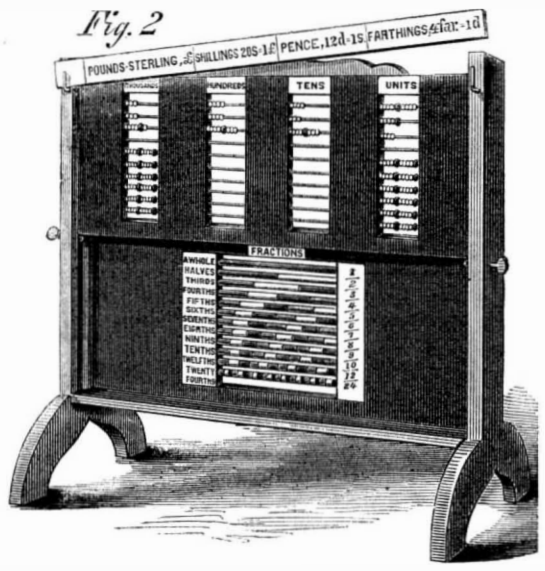

Fig. 2

Fig. 1 shows what the inventor calls an "alphabeticon." It is a frame supported on standards, the frame being composed of solid boards, having suitable apertures and slides in combination with a disk which revolves between the two sides of the frame, and is marked in annular spaces with the dipthongs, consonants, and vowels of any language, as English, German, French, etc. It may contain, also, the arithmetical characters from 0 to 9, inclusive. By turning the disk by means of handles inserted in its periphery, either of the letters or characters may be brought before the appropriate aperture in the side of the frame. The apertures may be covered, or partially covered, by slides. Cases attached to the sides of the frame may be made to hold such additional slips of letters, or other characters, as may be desired after those on the disk have been fully learned. If, for instance, the slide over the vowels is opened, the pupils see only that letter which is brought opposite the aperture in the side of the frame, but by turning the disk all the vowels may be successively brought to view. When sufficiently acquainted with any one of the series the scholars may be introduced to combinations of vowels, consonants, and dipthongs, by the presentation of the proper characters in combination to form syllables, words, and sentences. The patent for this apparatus dates January 2, 1866.

Fig. 2 is a contrivance on a similar principle, but intended, more particularly, for teaching arithmetic. It consists of an upright frame divided into two parts, an upper and a lower section, which slide up or down in grooves in the uprights. The upper section consists of four divisions and five blackboards, behind which are four hundred balls of wood or other material, there being ten strings or wires in each division, and ten balls upon each string. Besides, for the more ready computation, every fifth ball in each string is distinguished by a color differing from those on each side of it. The balls in the first division, at the right, represent the units; those on the second, the tens; those on the third, the hundreds; and those on the fourth, the thousands. The balls remain behind the blackboards when not in use.

If it is desired to indicate, for instance, 6485, you bring out 5 balls in the first division, 8 in the second, 4 in the third, and 6 in the fourth. At the same time the number of balls in each division, with figures, is written on the respective blackboard. If a division at the right remains empty, a nought (0) is written on the respective blackboard. The fifth blackboard is used to write down, in large numbers, the tens of thousands, the hundreds of thousands, the millions, etc. On this apparatus the pupil easily learns how to write numbers correctly by figures, and to count upwards and downwards, by 1, 2, 3, 4, 5, etc.

Addition, subtraction, multiplication, and division, are performed in a similar manner, the method of which for each operation is easily learned by a little practice.

For the purpose of teaching the fundamental rules of denominate numbers, there belong to this apparatus 7 sticks, containing 14 tables of money, measures, and weights. When these sticks are fastened above on the apparatus the balls will represent the things named on the sticks. The use of the balls is the same as in the simple numbers, only that the number of units that it takes of the next lower denomination, to make one of the higher, is different. For convenience of the teacher and pupil, these numbers for every higher denomination are given on the respective sticks. By seeing them very frequently, the child will easily learn them by heart.

The second section of this apparatus consists of one division and two blackboards, behind which are twelve cylinders of equal length upon twelve strings or wires. The cylinder upon the first string is undivided, thus representing a whole one. The cylinder upon the second string is divided into two equal parts, thus representing halves. Upon the third string there are the thirds, upon the fourth strings the fourths, and so forth, to the tenths. The eleventh string contains twelfths, and the twelfth string twenty-fourths, because both are of great importance in the different transformations of fractions. The two blackboards serve to hide the fractions not in use, and to make upon them the needed fractional calculations. Fractions can easily be treated, when their fundamental principles are clearly understood. The apparatus shows that the nature of fractions supposes a division into equal parts. The appearance teaches that in the more parts the whole is divided, the smaller the parts will be, and in inverse proportions; thus, that with equal numerators, those fractions are the smallest having the largest denominators, and those the largest having the smallest denominators. It will be seen that a fraction can be considered as a denominate number, of which the denominator is the name, and the numerator the true number. It will facilitate the pupil's writing fractions in the common way, and counting upwards and downwards with fractions. The pupil will readily learn what is meant by fractions of a common denominator, and understand that only fractions can be added or subtracted when they have a common denominator, or when they are reduced to equivalent fractions having a common denominator. How this reduction is to be done can be clearly shown by the apparatus. The appearance teaches that a whole one is equal to two halves, to three thirds, to four fourths, etc.; that $\frac{1}{2}$ is equal to $\frac{2}{4}$, to $\frac{3}{6}$, to $\frac{4}{8}$, etc; that $\frac{1}{3}$ is equal to $\frac{2}{6}$, to $\frac{3}{9}$, to $\frac{4}{12}$, etc.; that $\frac{1}{4}$ is equal to $\frac{2}{8}$, to $\frac{3}{12}$, to $\frac{6}{24}$, etc., etc.; and in inverse proportion. It is readily shown by it that the value of any fraction is not changed if both numerator and denominator of it be multiplied or divided by the same number. In the same way it will be observed that multiplication of a fraction is accomplished by multiplying the numerator or dividing the denominator, and that division of a fraction is effected by dividing the numerator or multiplying the denominator. If the pupil clearly understands these principles of fractions, all other exercises in them will be very easy.

Mental arithmetic can be readily taught by this apparatus, the advantages of which will be easily apprehended by the intelligent pupil, as well as by the teacher.

The patent for this device is dated March 3, 1863. "Reffelt's First Book of Arithmetic" is a guide to its use, which is for sale by E. Steiger, No. 17 William street, New York city, and the apparatus can be obtained either of him or of the inventor, H. R. Reffelt, 74 Bloomfield street, Hoboken, N.J., or of Nathaniel Johnson, 490 Hudson street, New York city, either of whom will receive propositions for territorial rights. The letters patent were obtained through the Scientific American Patent Agency. The frames for counting and for working fractions may be made and used separately, and are furnished thus or combined. These devices were exhibited in the Paris Exposition, and were very favorably noticed by the London journals.

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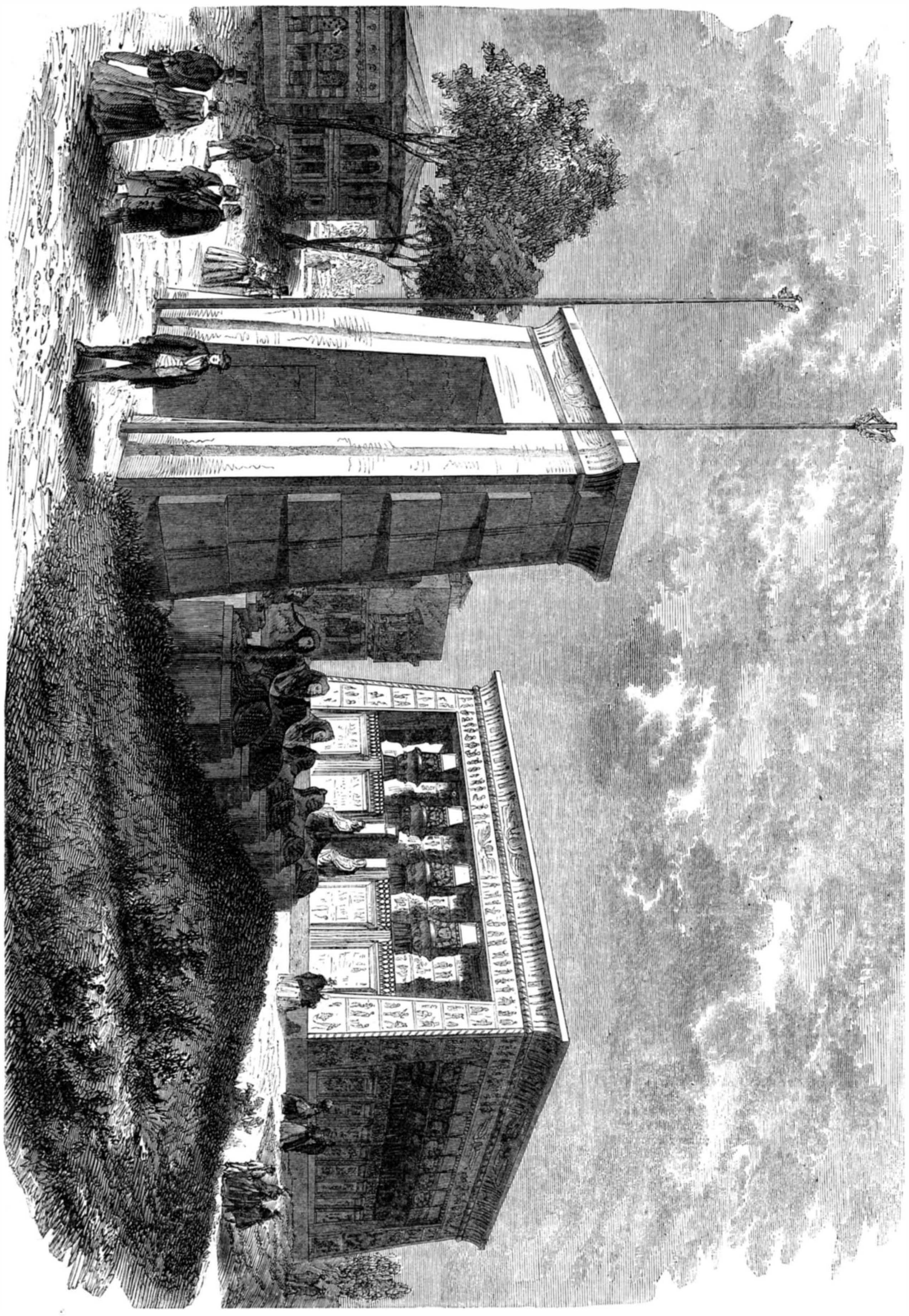

MODEL OF THE EGYPTIAN TEMPLE IN THE CHAMP DE MARS.

In front of the Temple stands a monumental gateway, ornamented on the front entablature with winged globes. With the exception of reduced proportions, this is a faithful reproduction of one of the gates of Thebes—the City of the Hundred Gates—where are found the largest ruins in Egypt, and from which place was brought the obleisk that now ornaments *La Place de la Concorde*. Passing through this gateway you enter an alley formed of two rows of granite sphinx, modeled from the originals, and that give some idea of what this majestic avenue must have been.

The one at Thebes was nearly 7,000 feet in length, and was not situated back of the gate, but in front of it, the intervening space between the center gate and the steps of the Temple being ornamented with magnificent trees. Sufficient space was not allotted to the Egyptian Commission to reproduce this arrangement, but the plan adopted gives a good idea of this splendid monument of antiquity.

This Temple is less the reproduction of any particular edifice than a study of Egyptian archeology. Notwithstanding, in its plan and general arrangement, as well as in the harmony of its proportions and the details of sculpture, it reproduces the Kiosk of Philos with sufficient exactness to call it an imitation of that celebrated structure. The outer vestibule, formed by massive columns, runs all round the sanctuary, in which are placed several of the wonders of the Museum of Boulac. The columns are most faithfully executed, and represent the stem of the lotus plant, with elaborate capitals in the form of the blossom, rendered in all their complication of form and color, with an exactness that attests the most advanced art. From the center of the lotus blossom rises a figure with four faces, that forms a second capital having an extremely original effect. The head is that of the goddess Athor, the presiding deity of joy and happiness, and who forms one of the Egyptian trinity Her face is repeated four times on each column, with a headdress composed of a piece of cloth twisted in a roll and entirely encircling the

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head, only suffering the cow's ears to appear that represent one of the forms under which this goddess is most frequently represented in the temples. Above these heads is a third capital, ornamented at the top with small symbolic serpents. On this rests the cornice of the temple, which slightly projects.

These columns are imbedded as high as their capitals in a wall that forms the first precinct of the sanctuary. The partially pyramidal style preserved in the construction of this building gives it a character at once simple, solid, and grand, and with which it is impossible not to be impressed. The outer walls of the Temple, as well as those of the corridors and the inner sanctuary, are covered with admirable hieroglyphic pictures, mostly basso relievos in the Egyptian style, and slightly projecting from a hollow background. All the inscriptions, cartoons, and figures, as well as the paintings, have been copied with the greatest care, and make a faithful picture of the events and exploits—religious, military, and civil—of this ancient people. Those on the outer walls represent the time of the Ptolemies cotemporaneous with the Roman Republic. All the subjects are religious, symbolic, and mysterious—kings and queens artistically grouped beneath slender palm trees, bringing lotus blossoms or jewels of the most brilliant colors and other offerings to their gods, who are depicted in the grandest and most imposing attitudes—small cartoons skillfully interwoven as ornaments, bear the name of the sovereign or individual performing this act of devotion. The walls of the corridors and the inner temple are also covered with paintings. Among them some of the time of Pharaoh, cotemporary of Moses. The subjects are purely religious, and are so finely executed and elevated in their character that they show Egyptian art and faith were then at their zenith. On the walls on either side of the principal entrance are two tablets, the carving on one representing the departure of an armed expedition—the warriors with battle axes, the transports and vessels laden with equipments. On the corresponding tablet is seen the queen receiving the victorious general on his return; the galleys are represented as vessels of pleasure as well as of war and have brought the queen to greet the expedition. With the army are seen the spoils and the prisoners.

The decorations of the inner sanctuary are those of the earliest date known. Opposite the entrance and in the center of each of the side walls are doors of oriental alabaster of a peculiar form and of the most complicated workmanship. The cornice, door posts, and the pillars that support the open roof are ornamented with wreaths of flowers, among which the lotus is preëminent. Entwined in all the decorations are two names that are incessantly repeated—those of Ti and Phtah-hotep, dignitaries of Memphis, and on whose tomb are seen nearly all the subjects that appear on the tablets. But here nothing is symbolic or religious in character, but simply admirable reproductions of scenes depicting the life of that period. Fishing, the chase, the arts and mechanics, animals of all kinds, birds, fish, cattle, horses, and dogs, gymnastic games in all their details, feats of skill, boating, etc., all are faithfully delineated and form a most complete summary of the life of the ancient Egyptians.

Animal Electricity.

To the agency of friction, the amber of the ancients, the chemical action of modern voltaism, the mysterious properties of natural and artificial magnets or loadstones, and that peculiar vital principle inherent in certain animals, are due all the effects generally included in the comprehensive term electricity. If to these primary causes we add those of terrestrial currents and inequality of temperature, we provide, at least in theory, for all those atmospheric phenomena hitherto inexplicable upon any known data. If, as a certain eminent ecclesiastic remarked, "chance is a word to express our own ignorance," what a "chance" electricity must be. It is to the *savant* and the philosopher what "heart disease" is to the coroner and the faculty. Exactly a century ago galvanism was first discovered, and the term was applied to describe a species of electrical excitation, presumed at that time to differ materially in its origin from all other similar effects. Evidently the cause was referred to some muscular agency, which produced a peculiar sensation or taste when two dissimilar metals were applied, one upon the upper and the other upon the lower surface of the tongue. Sulzer who made this discovery, ascribed it to some vibratory motion produced in the nerves of the tongue, naturally a highly sensitive organ, and inferior in that respect only to the eye. Galvani, whose name is familiar with the celebrated experiments upon the limbs of frogs freshly killed, more fully developed this theory, and was the father of a new school, which, while recognizing the cause of these post-mortem effects to be connected with electricity, yet affirmed that they were due to some especial modification of that unknown agent, residing solely in the animal system, and consequently bestowed upon it the appropriate name of animal electricity. The celebrated Volta was the first to successfully dispute this view of the subject, and to establish the identity of the origin of galvanic and electric phenomena. Recent experiments have confirmed the theory that animal electricity does not owe its origin to the formerly imagined action of the nerves or muscles, but eminates directly from a purely chemical source, the exciting cause being generated by the contact of the air with the incipient decomposition of the freshly-killed animal. Bearing in mind that a liquid, but very slightly saline, in contact with animal substance is an electrometer, it is easy to perceive that the so-called muscular current is nothing more than the current produced by their contact. To put beyond a doubt the question that a live muscle would generate electricity, which it could not produce when dead, contact has been made between the muscles of a live animal and the wires of a galvanometer, without the latter evincing the slightest sign of an electrical current. Moreover, if a portion of muscle be separated from the body of an animal freshly killed, and placed in communication with a galvanometer, a feeble degree of electricity is demonstrated. According to the opinion of a member of l'Academie Française, this is due to the influence of oxygen upon the flesh, a cause always existing when the muscles retain their normal state of irritability. Assuming that animal electricity was due to the cause surmised by Galvani, the evidence of the current would cease so soon as the muscles become completely inert, or, so to speak completely dead. But the reverse is the fact. The more decomposed the flesh becomes the stronger are the advances of its electrical condition, and when it has acquired a state of almost total putridity it imparts the maximum deviation to the astatic needle. That the presence of a saline liquid is necessary to these electrical effects is proved convincingly by several circumstances. One is that meat newly salted becomes electrical in proportion to the penetration of the solution, and the other that cured meats, whether beef, pork, or fish, evince a high state of electrical development. The blood of a living animal is altogether destitute of electrical excitation, but becomes capable of affecting the galvanometer so soon as the animal is killed, and its power increases with the putrefaction of the body. A small addition of common salt to the blood immediately increases its electrical sensibility. If the epidermis of an animal be removed the under layers of cuticle are highly electrical, as experiments upon frogs have demonstrated, and this condition is still further augmented by the addition of a saline solution. From these results we are justified in assuming that animal electricisy in its original symptoms is a delusion, and that without the intervention of some slightly saline liquid the nerves and muscles are *per se*, powerless to afford the smallest evidence of an electrical current. Unless a chemical action can be set up there is nothing to indicate the presence of that vital muscular agency which the first experiments in connection with the subject led the older philosophers to insist upon and adhere to. The animal current, which they so fondly prepounded and believed in, is simply an ordinary electrical current produced chemically by the contact of a saline solution with animal matter, in which combination the salt acts the part of the electrometer. Adopting this view of the question it is easy to perceive that the development of animal electricity, in invalids and diseased organs, instead of being due to the cause originalty entertained, is solely the consequence of chemical decomposition. Thus, for instance, the muscous membrane of the mouth becomes electrical in patients suffering under disease of the stomach or digestive organs, and strong evidences of it are manifested in malignant, cancerous, and other ulcers of a dangerous and fatal type. All animal excretions are electrical, and urine possesses this property in so remarkable a degree as to cause the needle of a galvanometer to make a complete revolution of the dial. The electricity of fishes results from an alkaline solution in the cells of the electric organs, and manifest itself very powerfully. All the effects of animal electricity may therefore be regarded as closely resembling those of fermentation and putrefaction, and to depend not upon any muscular or nervous hypothesis, but solely upon an incipient chemical decomposition in combination with chemical electrometers.—*The Engineer.*

Wooden Railroads.

The earliest form of railway consisted of wooden rails laid on cross ties. When well constructed there is no doubt of their utility and success. During the late war the Confederates were often obliged to make use of wooden rails, and over them they transported thousands of tuns of army supplies, and soldiers. A much higher rate of speed may be obtained on wooden roads than is generally supposed. If properly built, a speed of fifteen or twenty miles an hour may be safely attained, which is as much or more than is realized on some iron roads, rated as first class, but too often, in reality, rotten and unsafe concerns.

One of the requisites for the successful working of wooden railways is that the locomotive shall be light, and also the loads carried. Good broad faced wheels are also essential. Such roads are considerably cheaper than plank roads in first construction, and also in maintenance. Wooden railroads can be constructed in some localities for the small sum of $1000 a mile. The exhibition of a very little united spirit and energy among country neighbors would put their towns and villages into railroad communication with the principal through lines of travel.

Our attention has been called to this subject by reading the accounts of a projected wooden railway from Carthage, N. Y., to Harrisville, a distance of 47½ miles. The rails are to be of maple, strongly wedged into heavy cross ties, and the expense of the superstructure all complete is estimated per mile as follows:—

1,760 ties delivered, at 10 cts	$176 00
21,120 ft. B. M. maple rails delivered, at $15.	316 80
Wedges delivered, say	40 00
Notching ties and track laying	467 20
Total	$1,000 00

The solid maple rail 4x6 inches, wedged edgewise every three feet into heavy notched ties, forms a track equal in strength to that of any other railroad, and is capable of bearing heavy rolling stock, provided the wheels have a rim five inches in width. Fine sand and dust, which get on the rail, is soon crushed into the wood by the car wheels, and forms a hard and gritty surface, which does not wear, and greatly facilitates the traction. The maple rail, if sound, will last a number of years.

A good deal of interest, we might say excitement, is now going on in Jefferson County, N. Y., concerning these wooden roads. Mr. J. B. Hulbert enjoys the credit of being the projector and engineer. A short road of this kind built by him, six miles long, has been successfully used for eight years. He is now constructing a wooden railroad 22 miles long, to connect the Clifton iron mines with the Otwegatchie railroad. Sixteen miles of the new road are nearly completed, and a portion is in actual operation.

Asbestos, a Material for Glass Making.

The use of asbestos is yet very limited. Having a certain flexibility and being completely incombustible, it was in ancient and modern times used for the manufacture of fire-proof garments. It has also found application in the old "chemical fire boxes," which were small flasks containing the asbestos moistened with oil of vitriol. Ignition was produced in pressing ordinary sulphur matches which were coated with a mixture of chlorate of pottassa and sugar into the asbestos. The chlorate being decomposed, oxygen was given off, which in combining with the combustible matter produced fire. To-day asbestos is solely employed for the making "papier maché," and in the laboratory of the chemist for filtering acids. Its use for fire-proof safes has been abandoned, other substances having been found superior. But another important use lately suggested itself to our mind—it is that for glass making, and the following we hope will justify our suggestion.

In its chemical composition asbestos is a silicate of lime and magnesia, in which the alkaline earths are more or less substituted by protoxide of iron and manganese, and the silicic acid, sometimes by alumina. In all these, one part of magnesia is substituted by water, this being very probably the cause of its peculiar fibrous state. It has been found to contain in its maximum 3 per cent of alumina and 1·12 per cent of oxide of manganese; protoxide of iron is varying in most species from 3 to 11 per cent, only the asbestos from Sitkaranda, on the Ladoga lake, contains, according to Hess, 19·73 per cent of this oxide. Serpentine and turmaline, though occurring in the form of asbestos, do not belong to that species, as they are of an entirely different composition.

Glass on the other hand is a silicate of lime and potassa or soda, in which the alkaline bases may be substituted either by baryta, lime, strontia, or lead, whereby we get different kinds of glass. The strontia glass is what is called coelestin glass, being like the baryta glass largely manufactured in England. Magnesia can, according to Dumas, be introduced into glass to the extent of 6·37 per cent, perhaps more; Venetian aventurin contains 4·5 per cent of magnesia, and a smaller amount of it is found in various other kinds of glass. Comparing the composition of asbestos with those, we are led to the conclusion that it would be best to use it as an admixture to the composition of green bottle glass, as the following analysis undoubtedly will show:

	Green bottle glass.	Asbestos in long fibers.
Silicic Acid	64·5	55·87
Lime	23·3	17·76
Alumina	2.7	..
Soda	3·8	..
Potassa	2	..
Protoxide of Iron	3·7	4·31
Protoxide of Manganese	..	1·12
Magnesia	..	20·33
	100·0	99·39

A glance at the above analysis will show us that the two most important ingredients, lime and silicic acid, are contained in both the bottle glass and asbestos in nearly the same proportions. The latter differs from the former chiefly in containing 20 per cent of magnesia but no alkalies. Now, supposing that 5 per cent of magnesia at least might be introduced into the flux, we may for the manufacture of bottle glass be able to mix about one part of powdered asbestos of the above composition with three parts of the common flux now in use for the specific kind. That this proportion must be varied according to the composition of the asbestos is self-evident. Some of it is probably worthless for the proposed purpose, owing to the large quantities of iron it contains. As, however, this mineral is of abundant occurrence here and elsewhere (there is a "mountain" of it at L'Original, Canada—see Scientific American of 16th June, 1866), it would certainly be worth while to give it a trial.

Preserving the Bottoms of Iron Ships;—Welch's preservative cement is the last of the many compositions tried in England for preserving the bottoms of iron ships. It is an elastic cement composed of certain stone grits and bituminous substances, and with this the ship's bottom is coated with a layer about 1-32d of an inch thick. When firmly set a liquid cement is laid on with a brush, and on this latter is transferred a metallic facing of copper-dust, a liberal dusting of the copper facing with fine stone grit completing the process. Two vessels partly coated with this composition just returned from a twelve-month's voyage to China were covered with barnacles except where the composition was applied which was perfectly clean and presented the appearance of bright copper.

Counterfeit Creosote.—A large proportion of ordinary creosote is simply carbolic acid. But the pure creosote, which constitutes the lachrymosal property and peculiar smell of smoke, is quite a different substance, and may be distinguished from the false, as shown by Rust, by its behavior with collodion. A mixture with this latter and carbolic acid gives a gelatinous precipitate, while with true creosote the collodion remains clear. Dr. Hager gives another test. To a weak solution of iron, a few drops of ammonia are added until the precipitate which originally forms is dissolved. Carbolic acid communicates a blue or violet tinge to the solution, while genuine creosote gives a green color, afterward turning to brown

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Recent American and Foreign Patents.

Under this heading we shall publish w kly notes of some of the more prominent home and foreign patents.

STEAM GAS GENERATOR.—Hiram Maxim, New York city.—This invention relates to an improved method of generating gas from volatile oils for illuminating purposes, superheating the same and regulating the flow of steam by the pressure of the gas.

TELEGRAPH WIRE INSULATOR.—W. E. Simonds, Hartford, Conn.—This invention relates to an improvement in constructing insulators for telegraph wires, and consists in forming the glass, flint, or other insulated portion of the device independent of the peg by which it is connected with the post for supporting the wires, and so arranged in connection therewith that rain or the moisture of condensation shall not settle around the base of the insulator and furnish a medium for the escape of electricity from the wire to the ground.

BOX FOR AXLES OF RAILROAD CARS.—William Stowe, Hollidaysburg, Pa.—This invention relates to an improved construction of a box for containing grease for the lubrication of the axles for railroad car wheels, and consists in the arrangement of a sliding lid on the front of the box in such a manner that it cannot slip out or get loose, while it effectually shuts out the dust, and is very convenient and easily managed.

ARTIFICIAL LEG.—Charles Swett, Vicksburg, Miss.—This invention relates to an improved arrangement of devices for an ankle joint of an artificial leg, and consists in a combination of a vertical spring with horizontal india rubber plates arranged in such a manner that the foot may readily adapt itself to any required position when a step is made with the artificial limb, through the combined flexible action of the india rubber plates and steel spring, while by their elasticity the movement will be assisted and the foot will instantly resume its natural position when lifted from the ground.

SHUTTLE THREADER.—Lewis Ripley, North Chelmsford, Mass.—The object of the invention is to furnish a device for threading shuttles which shall obviate the old method of drawing the thread through the eye of the shuttle by suction with the mouth, which is attended with unpleasant and deleterious effects by inhaling dust and fiber into the lungs of the weavers.

BLEACHING AND STAIN REMOVING FLUID.—Maria E. Tompkins, Brooklyn, N. Y.—This invention or discovery relates to an improved composition or fluid mixture for bleaching cotton, linen, or other textile fabric, and for removing stains of ink, coffee, tea, fruit, leather, mildew, and other discolorations.

GAS METER.—David Forrest, Eastport, Me.—This invention relates to an improved method of constructing meters for measuring gas, and the invention consists in operating a tubular shaft by the pressure of the gas, after the manner of a "Barker mill," and discharging the gas from the arms of the said shaft into a chamber and registering the same by the action of the shaft.

KILN.—W. H. Guignon and W. D. McDonald, Warren, Pa.—This invention relates to an improved method of constructing kilns for charring and carbonizing wood for charcoal and for making coke.

VELOCIMETERS.—Edward A. Lewis, St. Charles, Mo.—This invention relates to an improved machine whereby the velocity of running machinery may be measured, and the invention consists in an arrangement of wheels and eccentrics which are operated by the moving machinery in part, and in part by clock work, operating an index finger on a dial plate.

STOVE FOR HEATING AIR.—J. A. Marvin, Red Wing, Minn.—This invention consists in arranging a heating drum above the stove, which is connected with it by sundry vertical pipes through which the products of combustion pass, and an evaporating pan, and casing around the drum and flue pipes.

LAMP CHIMNEY CLEANER.—John H. Lightner, Shirleysburg, Pa.—The lamp chimney cleaner embraced in this invention is formed of a series of spring bands, curved or bent from end to end, and secured at each end to and about a common center stem or rod, in the same direction therewith, in combination with a slide or collar or ring, so applied to the said springs, when moved up or down thereon, it will compress such springs against the center rod or stem or allow them to expand therefrom, so as to more fully and perfectly adapt the implement to the size of the interior of the globe or chimney in connection with which it is used.

TOY FORTUNE TELLER.—Charles T. Ford, Essex, Mass.—This invention relates to a toy for telling fortunes, or answering questions, and consists of a revolving wheel having prophetic sentences on its periphery, at some one of which the hand of a figure points where the wheel is stopped. There are also numbers on the inner periphery of the same wheel, which relate to questions and answers to be found on the scrolls forming part of the toy.

LUBRICATING COMPOUND.—F. T. Allyn, New York city.—This invention relates to a new lubricating compound, which is made with a view to increasing the efficiency of the material, and to reduce its expense.

SAFE DOOR BOLT,—John R. Pierson, Newark, N. J.—This invention relates to a new manner of locking safe doors, so that the same cannot be opened by the insertion of wedges, or by blasting, but only when all the bolts are withdrawn.

CASTERS.—L. Frederick Cerf, New York city.—This invention relates to a new manner of constructing furniture casters, so that they will be strengthened and prevented from bending and breaking. The invention consists in forming a projection on the sleeve which fits around the pivoting pin, said projection sliding on the lower edge of the ring which is laid around the furniture leg, or on the lower edge of the leg itself.

ELEVATED RAILROAD.—Sylvanus Warren and Wm. M. Blume, New York city.—This invention relates to a new manner of constructing and arranging the rails as well as the cars of street or horse railroads, and consists, first, in arranging an elevated track upon one single row of posts, said posts being so formed that they will support both rails of one track. The invention further consists in the use of a truck, which runs upon the aforesaid rails, and from which the car is suspended by strong, wrought iron bars; the said car thus hanging down so as to be near to the street, and convenient for the entrance and exit of passengers, and so that it can be conveniently drawn by horses. The invention also consists in the construction and arrangement of a brake, by which all the wheels of the truck can be stopped at once, and whenever desired.

PLANING AND SLOTTING MACHINE.—Charles A. Meinhardt, Fort Wayne, Ind.—This invention relates to a new device, by which a planing machine can be quickly converted into a slotting machine, and *vice versa*; the said planing machine being so arranged that it can work on level, tapering, or round, convex, or concave surfaces. The invention also relates to such a manner of arranging the cutter that the same cannot be injured during the return stroke.

LOCKS.—E. P. Porter and G. W. Hallett, Waterford, Ct.—This is an improvement on former inventions by the same parties, and consists, first, in so arranging the catches, and cam-shaped pieces, or "lift-ups;" and second, the combination with the catches to the bolt of a series of slides, either more or less, in number so constructed and arranged as to be thrown into such a position as the key is turned, as will prevent the catches being swung back too far for the spring catches which hold them out of contact with the bolt, to properly engage with them therefor.

DRILL FOR TEETH.—H. F. Bryant, Marathon, N. J.—The design of this invention is to supply a desideratum always existing in the profession of dentistry, and never hitherto provided for, by the construction of an instrument by which the posterior and table surfaces of the molar teeth can be drilled and excavated for cleaning and filling with equal facility to the anterior or any other parts of any of the teeth.

FILLING BOBBIN.—Charles H. Fiske, Lowell, Mass.—The object of this invention is the improvement of bobbins used in weaving to hold the "filling yarn," and it consists in giving to them a peculiar shape to prevent the slipping of the "filling," which is apt to occur in the operation of weaving.

PAPER BAG.—David Manuel and Calvin F. Manuel, Boston, Mass.—This invention relates to an improved mode of making paper bags and consists in cutting the material out folding the edges together in such a manner as to make a conical bag with a flap cap or cover for securing whatever the bag may contain.

MACHINE FOR DRIVING POSTS.—C. F. Fitch, Harbor Creek, Pa.—This invention relates to improvements in a machine for driving fence posts.

COOKING STOVE.—H. Stickney, Reno, Pa.—This invention relates to the construction and combination of parts in cooking stoves.

BEEHIVE.—Arthur Gray, Reiley, Ohio.—This invention relates to a new and useful improvement in the construction of beehives whereby the temperature of the hive may be rendered uniform or nearly so, that is to say, cool in summer and warm in winter; the hive also kept in a clean state, and the bee entrances rendered capable of being varied in dimensions so as to prevent the egress of the bees and still admit air for ventilation, and also control the escape of the drones, and admit of the free egress and ingress of the "workers," as may be desired.

DRAFT ATTACHMENT FOR HORSES.—Elias Sanford, Meriden, Conn.—This invention relates to a new and improved draft attachment for horses, whereby the use of traces is avoided and a central draft chain employed similar to that used with a yoke and cattle. The object of the invention is to overcome the difficulty attending the plowing of orchards with horses, to wit, the stripping off the bark from the trees in consequence of the ends of the whiffletrees coming in contact with the same.

MACHINE FOR ORNAMENTING BUTTONS.—John Tunnecliff and Patrick Cahill, Northampton, Mass.—This invention relates to a new and improved machine for cutting sinuous grooves in buttons manufactured of vegetable ivory and other materials which will admit of being cut or grooved. The object of the invention is to ornament buttons in this style in an economical and expeditious manner.

ATTACHMENT FOR THE KEY BOARDS OF MUSICAL INSTRUMENTS.—Eben Tourjée, Providence, R. I.—The object of this invention is to obtain, by a very simple and inexpensive means, an attachment for the key boards of musical instruments which will admit of the "touch" being increased or diminished in force as the performer may require, in order to assist in strengthening the fingers.

ROOFING.—R. P. Henry, Akron, Ohio.—This invention relates to a new and improved means for keeping the joints of board or plank roofing perfectly tight and weather proof, and it consists in caving the joints of the boards or planks covered by a sheet metal strip the edges of which are bent down and fitted in grooves in the boards or planks, vertical plates or break waters being also inserted in the grooves and the whole covered by a wooden batten, whereby a perfectly weather-proof roof of the kind specified is obtained.

ANIMAL TRAP.—J. W. Churchill, Pittston, Pa.—This invention relates to a new and improved animal trap of that class which are commonly termed self setting and it consists of a peculiar construction and arrangement of parts whereby a very simple and efficient trap of the class specified is obtained.

CAST IRON CAR WHEEL.—George Peacock, Selma, Ala.—This invention relates to an improvement in car wheels and consists in constructing the wheel with arms or spokes extending from the rim to the hub of the wheel fortified by a curved plate extending from the thinner or outside edge of the rim or tread of the wheel nearly to the hub, not united with it but leaving spaces between the arms or spokes of the wheel around the hub, whereby a current of cold air can be thrown around the hub as well as through the eye when cast, and on as much of the body of the wheel as may be necessary to produce an equal cooling and secure uniform contraction in the periphery and body of the wheel.

PAPER VESSELS, ETC.—Agustus Jennings, and Isaac Jennings, Fairfield Conn.—This invention has for its object to furnish an improved manner of forming or giving the desired shape to vessels and other articles made of water proof paper.

CORN PLANTER.—James M. Gordon and E. Christianson, St. Joseph, Mo.—This invention has for its object to furnish an improved corn-planter simple in construction effective and accurate in operation and which shall mark the hills so that planting may be done with convenience and dispatch and without its being necessary to previously mark the ground.

PLOWS.—Chas. Forster, Lebanon, Pa.—This invention has for its object to improve the manner in which the cutter and landside of plows are connected to each other and to the standard and mold board so as to make the connection stronger firmer and more secure.

ELEVATOR.—Ezra N. Curtice, Springwater, N, Y.—This invention relates to a device for elevating hay, grain or straw into place on top of a wagon as desired.

FRUIT BOX.—Henry B. Wilcox, Toy Mills, Pa.—This invention relates to a new manner of constructing polygonal fruit boxes, and consists in so providing and arranging the side boards, that the bottom is held between the same and is prevented from moving up or down, without projecting beyond the outside of the box, the whole box is or may be made of paste-board; the bottom and sides being perforated to allow proper ventilation.

UTERINE SUPPORT AND TAMPON.—August C. Rohleder, New York city.—The object of this invention is to arrange an apparatus which may be used as a tampon or shield to prevent the escape of blood from the uterus, for the purpose of stopping hermorrhage and also for other purposes; said apparatus being so arranged that it can be easily converted into a very effective pessary and support for the uterus.

ATTACHING MATCH HEADS TO THEIR MANDRELS.—Edward Myers, Cincinnati, Ohio.—The object of this invention is to attach a matched head to its mandrel in such a manner that it may be applied and detached with the greatest facility so that when it is desired to use the entire width of the machine for planing or surfacing, the matched head may be detached without any trouble or difficulty whatever, the mandrel remaining fixed or stationary.

STOVE DAMPER.—E. T. Duke, Plattsmouth, Nebraska.—This invention relates to an improvement in stove dampers, and consists of two flat rings, hung by means of loops at the extremities of the conjugate axis of an elliptical center plate, through the transverse axis whereof passes a square key or shaft.

MEDICAL COMPOUND.—S. Payne, Louisville, Ky.—The present invention relates to a new and improved medical compound, especially designed for the cure of hog cholera.

TOOL.—E. S. Fisher, Boston, Mass.—The present invention consists in so constructing a pair of durders such as are used for spacing off work upon metal, that it can be also used as a punch to prick, and thus mark the same, at one time, whereby much labor and time are economized.

REFRIGERATOR CAR.—J. B. Sutherland, Detroit, Mich.—This invention relates to an improved refrigerator car, and consists in such an arrangement of the internal fittings of a double-walled, double-rooted, double-floored car, as to insure a constant circulation of the air within the car, so that the warm air is conducted through ice chests, and thus cooled, returned to the body of the car.

COTTON AND HAY PRESS.—Barnabas B. Alfred, La Grange, La.—This invention consists in the use of a double screw, one end of which operates the follow block, and the other the press box, moving them in opposite directions.

APPARATUS FOR SPONGING CLOTH.—John R. Paul, Philadelphia, Pa.—In this invention the cloth is sponged by steam, applied through a perforated adjustable horizontal cylinder, around which the cloth is rolled,

MUSICAL NOTATION.—Virgil C. Taylor, Des Moines, Iowa.—This invention consists in a new method of indicating the key note to the eye, by making the line upon which it falls lighter, or, if it falls in a space, by making the space either narrower or wider, than the other lines or spaces of the staff.

CHURN.—Joseph J. Everst, Cumberland, Md.—This invention consists of a new form of dasher, a new device for operating it, and another operating in connection with the dasher, for the purpose of thoroughly beating and aerating the milk, and gathering and removing the butter from the churn.

GATE AND OPENER.—Theodore Munger, Jaynesville Iowa.—This invention relates to gates which open and shut by sliding horizontally back and forth, in a frame, and consists in applying to them a cord pulley and crank rod for the purpose of opening and shutting them, in a novel support for the crank rod, and in a peculiar latch or fastening operating in combination with the cord pulley and crank.

PORTABLE HOSE BRIDGE FOR STREET RAILWAYS.—A. L. Wilkinson, Huntsville, Ala., and E. Y. Beggs, Nashville, Tenn.—The object of this invention is to furnish a neat portable device by which hose lying across the tract can be bridged over so that the horses and cars will be enabled to pass it without inconvenience, and without damaging it.

WAGON.—Henry [illegible]rger, Leesburg, Miss.—The present improvements are applicable to wheelbarrows, carts, drays, wagons, railroad cars, etc., and consists principally in the application of a round revolving axle and bed plate, also, in furnishing both sides of the wheel hubs and boxes, similar to each other. The axles are turned off of a uniform size, with flanges to adjust the wheels to their proper places, on which axle nuts are screwed, for securing the wheels, as in ordinary vehicles.

CIGAR LIGHTER.—J. W. Tracy, St. Louis, Mo.—The present invention relates to a cigar lighter, which consists of a figure or ornament which is intended to sit on a counter or other suitable place in a saloon, etc., and is so constructed and connected with a gas pipe as to allow a small flame to be kept constantly burning, which will be increased as the figure or ornament is lifted to light the cigar.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as so metimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at 50 cents a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

J. W. S., of Conn.—To mend your broken amber mouthpiece smear the surface with boiled linseed oil and hold them over the mild heat of a charcoal fire, pressing the parts well together until the lute becomes hard and solid.

T. U. A., of N. C.—A large part of so-called coral jewelry is prepared artificially from marble dust made into paste by a very siccative oil varnish or soluble glass (silicate of potash) and a little isinglass, and colored by Chinese vermillion. Sometimes genuine coral cuttings or dust is agglutinated and afterward molded into the various objects required.

S. P., of Mass.—Most of the hair dyes and also the indellible inks contain nitrate of silver. Cyanide of potassium will in most cases remove the stains or marks of indelible ink from linen, etc.

S. M. N., of Me.—It is generally believed that hollow walls for dwellings are much superior to solid walls, especially for buildings of brick or stone, as they are much better non-conductors of heat than when solid.

F. H., of Mich., asks if "water cleansed with sal. soda, enough to make it feel slippery, will scale the inside of a steam boiler?" We do not think that water containing that alkali will form a scale. The scale in boilers is usually formed by the salts held in solution by the water. Frequently these suspended matters are of such a nature as to have a great affinity for the iron, and being separated and deposited by the heat form a coating on the interior of the boiler. One cause of the foaming of new boilers is the union of the oil, or other grease used in building the boiler with the alkalies held in solution by the water. Anything of a mucilaginous nature put into a boiler will cause it to foam. Even a small quantity of sugar will produce this result. The best remedy we know of for foaming is frequent blowing off.

J. G. W., of Pa., alluding to our notice in the SCIENTIFIC AMERICAN of Nov. 23, of a water wheel, the builder of which states it can be driven by the water passing through a two-inch pipe, asks why a pump could not be attached and driven by the wheel to return the water and thus the wheel be self propelling. He thinks it would work. We differ somewhat from this opinion. Similar propositions are almost daily suggested by correspondents to this office. J. G. W. had better study natural philosophy before he makes any expensive experiments in this direction.

Business and Personal.

The charge for insertion under this head is 50 cents a line.

Pattern Letters and Figures for inventors, etc., to put on patterns for castings, are made by Knight Brothers, Seneca Falls, N. Y.

Inventors and Mechanics interested in the wonderful process of reproducing oil paintings by mechanical means should order our "Journal for Popular Art," the first number of which will be mailed free. Addres L. Prang & Co., Boston, Publishers of "Prang's American Chromos."

Wanted—A second-hand low-pressure engine of about sixty horse-power. Address A. Catchpole, Geneva, N. Y.

Parties wishing to purchase good second-hand Portable and Stationary Engines, from four to fifteen horse-power, apply to Abram Logan, Tideoute, Pa.

Orrin Lane, Vermont, Chaut. Co., N. Y., wishes to know where he can get a Gage Lathe to turn all kinds of chair stuff.

For sale in Richmond, Va., the tools of a small Brass Foundery and Finishing Shop, Lathe Tools, Furnaces, Flasks, Patterns, etc.; will be sold at a sacrifice on early application. Addrsss Finisher, Box 92, Richmond, Va.

Manufacturers of alcohol and whisky stills, send descriptive Circular and price list immediately to W. C. Tucker, Columbus, Miss.

Inventors and Manufacturers of Agricultural, Mechanical, and other useful machinery, are requested to send Catalogues or Circulars, with price list, to Mr. I. W. Sperry, 113 West 36th street, N. Y. city.

Mans, White & Co., Hazleton, Luzerne Co., Pa., wish to correspond with parties manufacturing fire brick for stoves.

Wanted to purchase—set bolt machinery suitable for carriage bolts. Address Robert Miller, Perth, Lanark Co., Ont., Canada.

Wanted—a hub mortising machine, new, or second-hand if in good order. Address Box 1439, Philadelphia, Pa., with description and price.

Columbus Iron Works Co., Columbus, Ga., wish to know where they can purchase a good machine for heading bolts. Also, a good Machine for centering and straightening shafting ready for the lathe—from 2 to 6 inch shafting.

I wish to communicate with parties having the best patent for making ice, of one or two thousand pounds capacity a day. S. P. Holbrook, Box 2208, Boston, Mass.

Names of parties using steam wanted by H. N. Winans' Anti-Incrustation Powder, 11 Wall street, N. Y., to prove by circular the value of clean boilers, his 12 years experience being authority on the subject. Three postage stamps returned to pay for trouble.

I want to arrange with a good Machinist to manufacture a Patent Printers' Chase, to do away with "Furniture." By this invention the smallest quantity of "matter" may be imposed in any part of the largest chase ever made, and will require no more "furniture" than for the smallest chase. Locks up with quoins. No screws. Address Richard Yeomans, Printer, Cincinnati, Ohio.

Wanted Immediately—Address of all Manufacturing Companies in United States—especially of Tin and Plated Ware—for entirely new articles of Manufacture. Jno. I. D. Bristol, Detroit, Mich.

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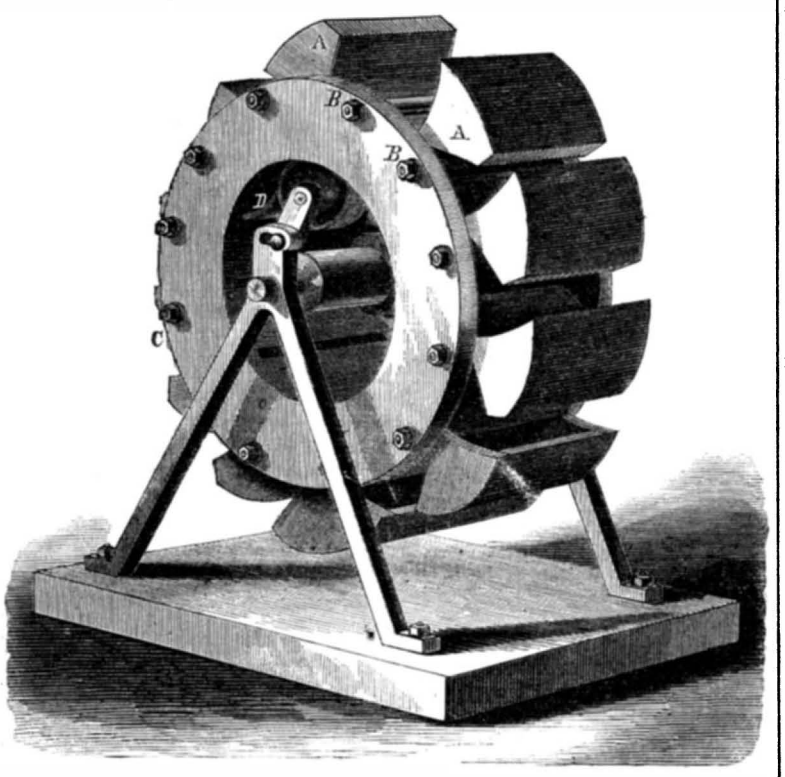
Improvement in Overshot and Breast Wheels.

The object of this improvement is to promptly empty the buckets of a water wheel when the water has done its work and to retire the ascending buckets inside the wheel rim to escape the weight of the atmosphere and reduce the weight of the ascending body. The frame of the wheel is made in the usual form, but the buckets, instead of being rigidly secured to the rims, are hung on pivots which permit a partial rotary motion. The buckets, A, are made quite deep and pivoted at each end to the sides of the wheel. The bolts, B, serve a double purpose, one to hold the sides of the wheel firmly together, and the other to sustain the buckets when in position to receive the water. The buckets are so hung that when they have passed the lower center and rise on the ascending side at C, they fall in toward the center of the wheel. To the bottom of each of them is affixed a curved arm —one seen at D— which passes through a slot or mortise through the rim of the wheel, and as it comes up to the top impinges on the shipping wheel or roller, supported on a stand fixed to the frame. This stand is adjustable by means of a stud in a slot in the main frame.

The bolts against which the buckets rest are covered with india-rubber the elasticity of which relieves the fall of the buckets as they resume their working position. The inventor says that the great advantage which this wheel has over others is that the buckets work by the natural laws of gravity, neutralizing the action of air and weight on the upward portion of the revolution and receiving the benefit of both on the downward portion, thereby reducing the quantity of water required. It can be manufactured cheaper than the ordinary wheel and works simply and effectively.

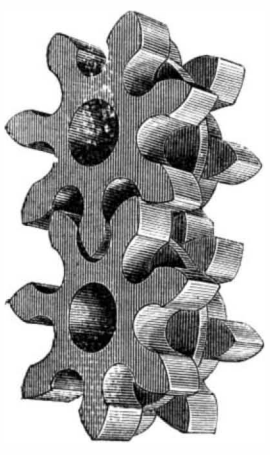
It was patented June 11, 1867, by E. G. Budd, who may be addressed at Budd's Lake, Morris county, N. J. He will dispose of the whole invention or will sell state and county rights.



BUDD'S REVOLVING BUCKET WHEEL.

ROWELL'S PATENT DOUBLE-TEETH GEAR, FOR CLOTHES WRINGERS, ROLLING MILLS, AND PLANERS.

That weekly annoyance, washing day, is a severe trial of the good temper of every member of the household, from those who perform the labor to those who witness its discomforts. Probably no device yet contrived has done more to lessen these annoyances and discomforts than the clothes wringer. It greatly diminishes the labor and expedites the work. Soon after the introduction of the Universal Clothes Wringer, which was the pioneer of these labor-saving implements and was first used used without cog wheels, it was ascertained that the rubber rolls were too short lived, owing to the want of an absolute connection between the two; the roll to which the handle was attached having not only to pass the clothes through the wringer, but by its friction to revolve the other. Hence the necessity for "cog wheels" to make an absolute connection between the two, so that they would revolve independently of the friction of the rubber. Still there was an obstacle to the perfect operation of the geared wringer, inasmuch as the distance to which the cog wheels could be separated without coming out of gear, in wringing thick clothing, bedding, etc., was very limited. It became necessary for the geared ends of the shafts to be so arranged as to prevent the cogs from separating too much, and a device known as a "stop gear" was applied. This was a pin on the journal of the upper roll to limit the amount of opening on the geared end. Of course all the separation of the rolls beyond that limit must occur on the opposite end. Thus the departure from parallelism in the axes of the rollers more or less cramped the gears and prevented their proper action.



The remedy for this evident defect has been supplied by the device represented in the accompanying engraving. It is the invention of Dr. Warren Rowell, and was patented Sept. 3d, 1867. This gear is double, or may be made triple if needed, thus requiring fewer teeth, while the amount of retrocession is greater than with any single gear and the working of the teeth is smoother and more even. The laying out of the teeth is according to strict geometrical rules, and doubling the teeth increases the strength as well as the capacity of the gear, as by the teeth alternating they come in contact as often as if they were twice as fine. Wheels thus constructed can be made of one-and-three-quarters of an inch diameter and yet be separated four-tenths of an inch without slipping gear, propelling each other as well as when closed. We have seen a set of gears with only five teeth each, modeled by Dr. Rowell, which worked as perfectly under all circumstances of close contact and expansion as though they had fifty or a hundred teeth; a three-wheeled model of this diameter separated three-quarters of an inch and yet was in fair working contact with its fellow. The Doctor applied this device to a rolling mill some years ago and it worked so well that he conceived the idea of its valuable application to the common wringer. It is hereafter to be used on the Universal Wringer to the exclusion of every other gear. The ring between the sections of the gear strengthens the teeth, and being, like the teeth, beveled, the gear is kept working in the same path under all circumstances. It is applicable to wood planers or rolling mills as well as to wringers.

Communications from interested parties for the wringer may be addressed to R. C. Browning, 32 Cortlandt street, New York, and for the use of the gear for other purposes apply to the Metropolitan Washing Machine Company, Middle field, Conn., or to the inventor, 23 Rutgers street, New York.

New Gold and Silver Ore Machinery.

Some time ago we chronicled the grant of patents to Mr. M. B. Dodge, for machinery for working gold and silver ores. The patents were obtained through the Scientific American Patent Agency. We are pleased to learn that these inventions are now in successful operation in the distant mountains of Idaho; also, in the nearer regions of North Carolina. From the assays made of the ore before working, and of the tailings after working, the mill is found to take out ninety per cent of the gold, which netts the company—the Empire Gold Mining Company of North Carolina—a large percentage over the expense of mining and milling the ore.

One of the Dodge mills for silver has recently been put up in Flint district, Idaho. Dodge's Improved Furnace for calcining and chlorodizing Silver Ore is also in use there, and late news from the superintendent states that it has proved a great success, being far in advance of the old mode of working. These improvements are manufactured by the Holske Machine Company, No. 528 Water street, New York city.

Purchase of St. Thomas and St. John.

The negotiations by the United States Government for the purchase of the islands of St. Thomas and St. John, from Denmark are stated to have been completed. The sum to be paid is seven million dollars in gold or nearly ten millions in currency. The New York *Herald* says that a detachment of troops and military officers have already gone to take possession.

The Danish West India islands heretofore comprised St. Thomas, St. Croix or (Santa Cruz) and St. John or (St. Jan). The island of St. Thomas is situated about forty miles east of Porto Rico, in latitude 18 degrees 20 minutes north, longitude 64 degrees 15 minutes west. It contains an area of forty-five miles of rugged and well elevated surface, though there are no very high mountains. It is seventeen miles in length by about five miles in breadth. At one period it was well wooded, but the timber has been cut from year to year, which has militated against its agricultural qualities to a considerable degree, laying the surface bare to the tropical rays of the sun, which has had the effect of drying up most of the springs that once irrigated the land. The soil is sandy, and a great portion is entirely uncultivated, only about twenty-five hundred acres being planted with sugar cane, which produces sugar of an excellent quality. There is an extensive trade at the town of St. Thomas, much of the produce of the neighboring islands being sent there for shipment to Europe. It is also the principal station of the West India and European mail steamships, and some three thousand vessels annually visit the island, in the course of mercantile trade. The flags of most of the principal European nations are to be seen floating from the consular agents', and altogether St. Thomas is a somewhat brisk and thriving seaport. It is unquestionably the best location, besides Havana, for a naval station, to be found in the whole West India group. The population is thirteen thousand souls. The United States and South American packets all stop at St. Thomas, connecting with the European packets. Good dockage is afforded for merchant ships, and many have their repairs made at that port. The port is known to its former Danish owners as Charlotte Amalie, and is picturesquely built upon three hills or spurs of a mountain which is at the back of the city. Its harbor defences comprise two water batteries and the citadel of Christian Fort. There is an English colonial bank and a local bank in the city; a Lutheran, Dutch Reformed, an English Episcopal, a Catholic, and Moravian churches, besides a Jewish synagogue. Slavery is still in existence on the island, but the slaves are not numerous, being about one to every five whites.

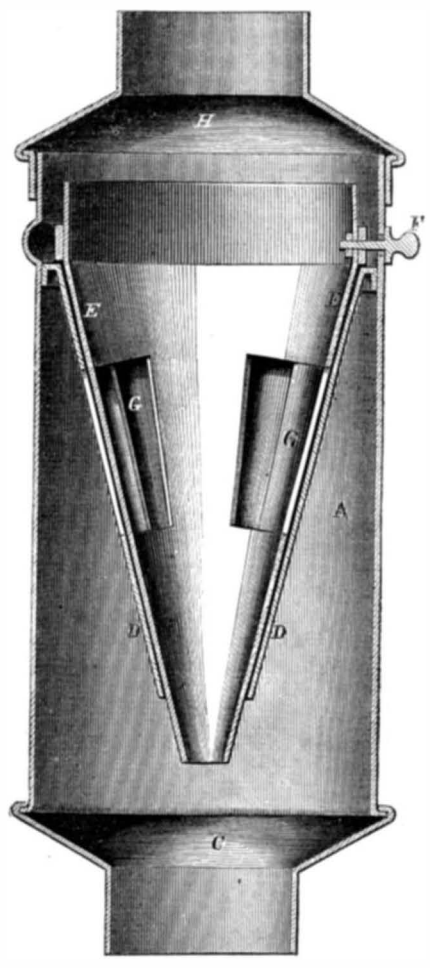
The island of St. John or (St. Jan) is but a few miles east of St. Thomas, containing an area almost equal to that of the latter island. The population is similar to that of St. Thomas, but numbers less that three thousand, most of whom are to be found in the town of Christiansburg. The products are the same as those of St. Thomas.

It is safe to predict that Yankee enterprise will before many years lead to a better development of the resources of both of these islands.

WEBSTER'S DAMPER DRUM FOR STOVEPIPES.

There can be no reasonable doubt that much of the heat evolved from our stoves calculated to warm rooms is wasted by the imperfect combustion of the fuel and by the too rapid escape of the heated gases. In the ordinary stove, range, or furnace as soon as the fuel is ignited the products of combustion go up the chimney, merely disposing of a very small proportion of their heating capacities in their rapid upward progress. The design of the device shown in the engraving is to delay this progress, thus utilizing the heat otherwise wasted, without impeding the draft.

A is an enlarged section of the stovepipe from eight to fourteen inches diameter and about two-and-a-half feet long. To the upper end of the cylinder is attached a cap, H, with which the pipe leading to the chimney is connected, and to a similar base, C, the pipe leading from the stove is fitted. D is an inverted cone the base of which is securely riveted to the upper part of the drum. E is a similar inverted cone fitting in the cone, D. To the base of E, is riveted a band which rests and slides upon the base of the outer cone and by which it is suspended. This cone may be partially rotated by means of a handle, F, passing through a circumferential slot in the cylinder. Both the cones have openings, G, in their sides, so arranged relatively one to the other that by moving the handle, F, they may be either entirely closed or opened. These act as dampers to the draft of the stove. The points of the cones are cut off to allow sufficient draft through the opening to insure combustion, even when the apertures in the sides of the cones are closed. This lower opening and the inclines of the cones allow the ashes, sparks, and soot that may be carried up by the draft to fall back into the stove instead of being carried into the chimney.



Patented through the Scientific American Patent Agency Nov. 5, 1867, by Eben Webster, who may be addressed relative thereto at Holland, Mich.

IN 1794, Robert Patterson, of Philadelphia, Pa., received the Magellanic Gold Medal of the American Philosophical Society for his improvement in lightning rods. The object of his improvement was to prevent the points of lightning rods from being melted by the electric stroke. The invention consisted in the use of a point made of plumbago, which is capable of enduring an immense heat without melting. Robert Patterson also suggested the use at the base of the rod in the earth of a quantity of charcoal as being a good and enduring conductor of electricity.

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NEW YORK, SATURDAY, DECEMBER 14, 1867.

Contents:

(Illustrated articles are marked with an asterisk.)

*Improvement in Machines for Planting Cotton 369
*Railroad Safety Switch 369
Suggestion for Theatrical Managers 369
Experiment in Oil Pumping 370
The Glacial Epoch 370
Spouting Wells and Flowing Springs 371
The Waste of Fuel 371
Railway Bridges—Their Material and Mode of Construction 371
Iodine and Carbolic Acid 371
Natural Qualities and Peculiarities of Glass 372
On the Manufacture of Malleable Castings as Practiced in Europe 372
*Reffeit's Educational Apparatus. 372
*Model of the Egyptian Temple in the Champ de Mars 373
Animal Electricity 374
Wooden Railroads 374
Asbestos, a Material for Glass Making 374
Recent American and Foreign Patents 375
Answers to Correspondents 375
*Improvement in Overshot and Breast Wheels 376
*Rowell's Patent Double-teeth Gear, for Clothes Wringers, Rolling Mills, and Planers 376
New Gold and Silver Ore Machinery 376
Purchase of St. Thomas and St. John 376
*Webster's Damper Drum for Stovepipes 376
Burning of a Mail Car 377
Mechanical Engineering in the United States 377
Utilization of Coal Dust and Culm 377
The Exposition's Exit 377
The Bergen Nitro-glycerin Explosion 377
Patent Claims 378, 379, 380, 381, 382
Pending Applications for Reissues 382
Extension Notices 382
Inventions Patented in England by Americans 382
Important Patent Case 382
Manufacturing, Mining, and Railroad Items 382

BURNING OF A MAIL CAR.--DESTRUCTION OF SEVERAL THOUSAND COPIES OF THE SCIENTIFIC AMERICAN.

On Wednesday night, the 27th inst., a kerosene lamp exploded in a mail car, in Jersey City, setting fire to the mail bags, of which there were about thirty, all containing newspapers. Twenty of these bags were destroyed. and with them several thousand copies of the SCIENTIFIC AMERICAN of the last issue. We have provided for this loss by having a new edition printed. As it is impossible for us to know who of our mail subscribers may be deprived of their paper, we desire that those who do not get last week's issue (No. 23) will write for it, and it shall be supplied by return of mail.

Other publishers have suffered from the same accident, but we hope not to so great an extent as ourselves. Who will invent an inexplosive kerosene lamp ?

MECHANICAL ENGINEERING IN THE UNITED STATES.

Under the heading "Why not go to America" a late number of *Engineering* attempts to enlighten its readers in regard to the state of mechanical engineering in this country. It says: "With respect to mechanical engineering, engine factories and kindred establishments are, of course, neither so numerous nor so extensive as here. And none employ anything like the number of draftsmen to which we are accustomed in such factories. A single draftsman is commonly reckoned enough for a large locomotive factory or an extensive railway workshop, and his duties are confined chiefly to making large scale skeleton drawings for fixing centers, etc. We have known large locomotive works, turning out a hundred engines a year, in which no transverse section of any engine existed, the position of the journals upon the axles, and other matters of a like nature being shown by cross marks on one-inch square wooden staves, of which a small bundle was laid away somewhere in the pattern shop or in the foreman's room. It will be underotood, therefore, that mechanical drawing is an art not very extensively practiced in the States, and the young engineer would be edified to see bow much is done by a few marks cut with a knife into a board, full size, by the "boss" (Yankee for master), and how much is left to the pattern makers."

We cannot believe that the editor of *Engineering*—himself of American birth and education—would consciously make a misstatement on this or any subject; but we are quite certain he is in error in regard to the practice in nearly all our establishments of any consequence.

The statements in regard to the practice of locomotive and railroad shops, and the duties of the single draftsman might have been made with a certain degree of propriety twenty years ago, but they certainly are neither applicable nor just now. We presume that the large locomotive works turning out one hundred engines a year which possessed no transverse section of an engine, was the one with which the editor of *Engineering* was connected when here, and it may be that it has not changed in its practice since; but it is doubtful if there are many others similar in this respect. The large locomotive or extensive railway shops which employ but one draftsman whose duties are chiefly to make large scale skeleton drawings we think are not very numerous, neither do we believe that sticks of wood with notches cut upon them are *generally* considered as reliable guides for setting up an engine.

A sight of the dirty and almost illegible drawings in every foreman's room would quickly correct the error that the work of the mechanical draftsman is not appreciated in this country. In shops of any pretensions whatever, the drawings of a machine are as necessary to the boss, if not to the workmen, themselves, as the tools with which the work is performed.

Still, it cannot be denied that too little attention is paid to the great preliminary work of drawing. Even now too many of our mechanics are content to correct the inexcusable errors of the draftsman in the pattern shop; and sometimes not even here is the mistake remedied, but the casting is made or the forging completed before the error is rectified. Some employers say they cannot afford to pay for first-class talent in this department, but probably they would find a pecuniary advantage in doing so, while it is certain an adequate compensation would stimulate our young engineers and draftsmen to qualify themselves more thoroughly than they at present deem necessary.

Every apprentice should be taught to work direct from the drawings without the intervention of patterns or models. In this way he would become accustomed to the calculations involved in drafting and fit himself for its practical study. We remember some years ago an extensive locomotive and stationary engine shop in Massachusetts, where perfect patterns of every part of the machine were furnished the forger and finisher as well as the molder. Nothing was to be done by the workman but to follow implicitly the lines and dimensions of the pattern, that for the forger being just enough larger than that for the finisher to allow for finishing. Of course, work thus done was purely mechanical and the workman improved only in one direction, that of skill in manipulation. This practice of furnishing patterns instead of drawings was found to be unprofitable and was subsequently abandoned.

UTILIZATION OF COAL DUST AND CULM.

A very large percentage of all the coal mined, whether anthracite or bituminous, is wasted in the processes of preparation for the market. Anthracite coal is very brittle, and during the processes of breaking and screening the angular particles fly off at the slightest touch. Bituminous coal, on the contrary, is quite soft, and by handling, the particles fall off as fine dust. To such an extent have these wastings accumulated in the vicinity of coal mines that one of our Pennsylvania exchanges informs us that the "owners of the mines have for a long time been put to their wits to know what disposition to make of this rapidly and continually increasing material. It was at one time proposed to bury it in the exhausted mines, but these it was found would contain but a small portion of it. Another proposition was to throw it into the river, but this was rejected, because of the fact that the channels of the rivers would have been obstructed. A third idea was to burn it, but this would have been the task of ages, so that the mine owners were compelled to abandon all the plans presented as impracticable, and look in other directions for the desired relief. It has now been ascertained that this 'culm' may be used for manufacturing purposes, and that it is successfully employed by some of the companies in the vicinity of the mine. But enough of it has already accumulated in the Lehigh and Schuylkill region to drive all the machinery of the world for a century, and this cumulative process is in continually uninterrupted progress. Experiments made with it some years ago at Albany demonstrated the fact that, with a little preparation, it could be used for all ordinary domestic purposes. It was, by the use of a liquid composition, formed into small bricks or cakes, and a fire made from this preparation, burned twenty-four hours, with a very slight perceptible portion of the mass being consumed."

From this statement some idea may be gathered of the immense amount of this waste, at present but little utilized. The accumulations of anthracite culm would be found to have suffered probably little deterioration in quality from the action of the weather; but the bituminous coal dust will part with a large proportion of its hydrogen, which, however, may better fit it for useful manufacturing purposes. Undoubtedly, furnaces can be constructed which would burn coal dust as easily and economically as the larger coal is now burned. Indeed, such furnaces are now in successful use; but the inconvenience and expense of transportation of the dust seems to be a serious obstacle to its general introduction. That it has been manufactured into cakes or lumps convenient for transportation and for use would seem, however, to prove that it is possible to turn this hitherto useless waste to good account. We believe that fine coal, properly managed, can be burned with more economy than large lumps, as the oxygen has a chance to reach the whole substance sooner than when in a large mass and the combustion is, therefore, more perfect and attended with less loss of heating gases. Perhaps this fact is not applicable to coal dust, which lies very compact, but some device for introducing the oxygen and permeating the whole mass could easily be contrived.

THE EXPOSITION'S EXIT.

This grand hobby of an Emperor quietly closed its seven months' existence on the 4th day of November last. The event was deemed of so little consequence that not even a cable telegram came to inform us of it, and our foreign files make but brief notices of the cessation of this latest and largest world's show. In them we read of no popular parade rendering the demise imposing, the only ceremony being the simple one of turning out the gas and the people. During its last days the whole palace seemed more than ever converted into a grand sale-booth, nearly every article of merit or value being ticketed with labels, big and little, bearing the one word "*Vendu.*" Such articles as were not thus or otherwise disposed of have been packed up preparatory to removal, the operation being conducted under the strictest governmental surveilance, no one entering or leaving the building without producing the pass-card furnished by the authorities.

A curious fact made public in connection with the close is that the Exposition actually comes to an end before all the catalogues have been published. The vastness of the exhibition has quite outrun all efforts to appreciate the value of the contents, and the innumerable special correspondents who have attempted to give to their journals anything like a detailed account of the wonders therein assembled will not find their occupation closed with the Exposition, but for some time to come must draw material from their note books and liberally on their imagination before their labors will all faithfully have been performed. It will be a great curiosity to have one of the catalogues of a non-existent collection when M. Deuter gives them to the public, but the intrinsic value of such publications, for either their original purpose or as light reading, will hardly be very great.

The Imperial Commissioners have published in the *Moniteur* a note explaining the cause of delay in distributing the medals awarded in June last. Wishing to give to each medal a special personal character, they decided to place the name of the exhibitor in relief thereon, and this necessitated the making of a die for each of the sixteen thousand recipients. The gold medals were to have been distributed from the 15th to the 30th of November; the silver medals from the 5th to the 31st of December, and those to whom bronzes were awarded will receive the same between the 15th day of January and the 20th of February, 1868.

An approximate calculation has been made of the aggregate amount of receipts during the Exhibition. For entrance fees at the wickets $2,000,000 was taken in; for season tickets, $160,000: and to these amounts are to be added large sums resulting from the sale of privileges, in the aggregate not less than $800,000 to $1,000,000. The Imperial Commission, or rather the company to whom the concession was made, has therefore received in all considerably more than $3,000,000, a sum greatly in excess of the expenses of the enterprise, for the guaranteed fund only represented $300,000.

In commenting on this last "world's exhibit," our English neighbors are drawing many useful lessons, and while indulging in no very laudatory terms at the employment of French eyes for viewing English goods, and chagrined at not carrying off more laurels, they have come to the sage conclusion that in many of the arts of life their nation is not so completely the salt of the earth as they fondly imagined, and that perhaps their salt, such as it is, is losing its savor. As for ourselves, it may be pardoned if we indulge in a little natural pride, considering the paucity, in number at least, of our display, and the large number of premiums which Americans carried off. Of this latter fact the disinterested public will for many months to come be reminded by the fortunate competitors who in a plethora of advertisements will for a long time proudly point to the high regard with which their various wares were held by the awarding committee, and facsimilies and full-size representations of the medals, ostentatiously posted, will greet our eyes on every side.

And now in bringing the series of descriptions, letters, and items with which from time to time we have attempted to give our readers some conception of the vanities of the world in the Exposition assembled, and recording at last the unlamented desinence of the whole enterprise, the old apothegm seems an appropriate epitaph:

Sic transit gloria mundi.

THE BERGEN NITRO-GLYCERIN EXPLOSION.

The fact that another terrible accident has resulted from the careless handling of this explosive, has been made known by the public press generally throughout the country; but the coroner's investigation, which is now being carried on in Jersey City, has furnished us with a more reliable account of the disaster than the hastily written reports, and the manifestly absurd explanations which have appeared in the daily papers. It appears that in making a deep railroad cutting, near South Bergen, N. J., the Central Railroad Company have been using glycerin, by preference, for powder. Late on the afternoon of the 25th ult., one of the employés who had charge of the blasting operations, entered a blacksmith's shop erected near the excavation, with a tin can containing about sixty pounds of glycerin, which had become partially congealed. With the intention of softening its contents, the can was placed in water, and the temperature of the latter was rapidly raised by plunging into it red-hot bars of iron, a mode of procedure in melting the glycerin. Exactly how the disaster was caused will never be explained, as all persons in the building miserably perished with it. In all probability, however, one of the bars came in immediate contact with the can, imparting such a high degree of heat to it as to cause the explosion of its contents. Such was its destructive force that no vestige of the blacksmith's shop remains, its site being as clear as if the building had been carefully moved away. The coroner's inquest, and the investigation incident thereupon, have not closed at we go to press, but from the testimony already given it would appear that the lives of the eight victims can be charged only upon the stupidity of a drunken employe, who paid his life as a penalty for his recklessness.

A PECULIAR AIR PUMP formed of two barometer tubes was lately to be seen in London. In it the ascending and descending mercury is made to perform the office of pistons, and by means of double valves at the top to exhaust the air from the bell-jar. The vacuum which resulted was declared nearly perfect, or greatly superior to the effect from the employment of the ordinary air-pump.

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OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office,

FOR THE WEEK ENDING NOVEMBER 26, 1867.

Reported Officially for the Scientific American

PATENTS ARE GRANTED FOR SEVENTEEN YEARS the following being a schedule of fees:—

On filing each Caveat.....$10
On filing each application for a Patent, except for a design.....$15
On issuing each original Patent.....$20
On appeal to Commissioner of Patents.....$20
On application for Reissue.....$30
On application for Extension of Patent.....$50
On granting the Extension.....$50
On filing a Disclaimer.....$10
On filing application for Design (three and a half years).....$10
On filing application for Design (seven years).....$15
On filing application for Design (fourteen years).....$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ *Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to Inventors, may be had gratis by addressing MUNN & CO., Publishers of the Scientific American, New York.*

71,261.—DEVICE FOR ATTACHING LAMP BURNERS TO LAMPS.—Joseph Bell Alexander, Washington, D. C.

I claim the application of the device for attaching lamp burners to lamp fountains, as described and set forth.

Also, the projections, H and H', in combination with the burner, A, and the notches, L and L', and the inclined planes, I and I', and the projections, K and K', in combination with the collar, D, or their equivalent, substantially as described and for the purpose set forth.

71,262.—CARRIAGE EVENER.—Chas. L. Ames, Bangor, Me.

I claim, 1st, The central adjusting plate, a, when constructed and combined with the evener in manner substantially as and for the purposes specified.

2d, The whiffle-tree adjusters, e e, when constructed and combined with the evener and whiffle-tree, substautially as described and shown.

71,263.—MACHINE FOR PLANTING COTTON SEED.—Jas. Armstrong, Bucyrus, O.

I claim, 1st, The principle of planting cotton seeds in the condition they come from the gin, by a machine conveying said seeds from the upper part of a hopper or case in longitudinal rows to the place of delivery at the lower end of said case, by means of brushes, picks, and inclined grooves circling around a revolving cylinder, as herein described, or any other substantially the same, and which will produce the same ends herein intended.

2d, The principal of expelling cotton seeds from the case or hopper of a cotton planter singly by the percussion of a spring raised on and striking from inclined planes, substantially as herein shown.

3d, The construction and combined method of operating the slide or cut-off, K, and the spring, N, by means of the lever, O, and the pivoted and forked lever, M, substantially as herein shown.

4th, The construction of the entire "cotton planter" machine, as herein described, for the purposes set forth.

71,264.—THIMBLE-SKEIN FOR AXLES.—William D. Baughn, Milford, Mich., assignor to himself, George P. Booth, S. D. Honowell and F. A. S. Burnham.

I claim the construction of a skein, whether of cast or wrought iron, or steel, as hereinbefore described, provided with the well or drop, C, the opening, D, to receive the oil, and the holes or openings, E E, etc., or their equivalents, for the purpose specified.

71,265.—SCROLL SAWING MACHINE.—H. L. Beach, New York city.

I claim, 1st, The saw straining spring arrangement, N F S P, in its combination and relative action with rod, R', crank shafts, C S and C' S' and saw, S, all constructed in the manner and for the purpose above set forth and described.

2d, The combination of saw, S, guides, G M G, and G', rod, R', sliding guide rods, G R, and G' R' cranks, C and C', crank shafts, C S and C' S', slotted pitman, P' P', and slotted connecting rod, C R, the whole combined, constructed and operating in the manner and for the purpose above set forth and described.

71,266.—HOSE COUPLING.—William G. Bedford, Philadelphia, Pa.

I claim, 1st, A coupling, consisting of a section, A, with a socket, a, shoulders, b, and lugs, d, d, and a section, A', having a tubular projection, a', lugs, e e, and shoulder, f, the two sections being constructed and adapted to each other substantially as described.

2d, The combination of the spring catch, n, on the socket, A, with the tubular projection, a', and its ratchet teeth, i i.

71,267.—STEAM ROTARY VALVES.—Louis Begon, San Francisco, Cal.

I claim the arrangement of the opening, b b, and two exhaust-passages, B B, in the conical valve, A, in combination with the ports, C F', G G', and exhaust-ports, H and H', in the case, C, substantially as described.

71,268.—LAMP.—Geo. A. Beidler, Chicago, Ill.

I claim, 1st, In combination with an annular oil reservoir, and an inner tube or air chamber for conducting air to the flame from below, a metallic wick tube, extending down into said air chamber, and so constructed and arranged as to operate as a conductor of heat, to rarefy the air in said chamber, and cause an ascending current therein, substantially as described.

2d, In combination with a tube or hollow case for conducting air to the flame from below, an i a metallic conductor to convey heat down from the flame into said tube or hollow case, and rarefy the air therein, to cause an ascending current, I claim a glass globe or cup surrounding the flame, with apertures for introducing air within said globe or cup, and feeding the flame above the dome deflector, substantially as described.

3d, In combination with a tube or hollow case for conducting air to the flame from below, and a metalic conductor to convey heat down from the flame into said tube or hollow case, and rarefy the air therein, to cause an ascending current, I claim one or more perforated plates, so located between the base, where the air enters the tube or chamber and the flame, that the air must pass through said perforated plate or plates before reaching the flame, substantially as described.

71,269.—GAS STOVES.—A. L. Bogart (assignor to H. C. Bogart and J. P. Kennedy), New York city.

I claim, 1st, The combination of the burner, T, and vertical tube, C, with the funnel, F, pipe, H, trays, J L, openings, P, arranged substantially as herein described and for the purpose set forth.

2d, In parlor or heating gas stoves, the use of quick lime or other suitable chemicals in the trays, J and L, for the purpose set forth.

71,270.—STILL.—Geo. W. Bookwalter, Roanoke, O.

I claim, 1st, The flue, D, arranged substantially as described for the purpose designed.

2d, The drum, E, upon the pipe that conveys the steam to the condenser, or any similar device for the purpose described.

3d, The combination and arrangement of the still-boiler, A, the conduit pipe, B, the smoke stack, C, with the flue, D, and the drum, E, all arranged substantially as described for the purpose designed.

71,271.—FURNACE FOR ROASTING ORES AND OTHER PURPOSES.—Edward Brady and John Sloan (assignors to Edward Brady), Philadelphia, Pa.

We claim the construction of furnaces for melting ores, etc., making gas bake-ovens, and for other purposes, of the known forms, by the employment, application and combination of metal plates, B, with the compartment, C, constanly filled with water, all of which operate substantially for the objects, set forth.

71,272.—CATTLE GUARDS FOR RAILWAYS.—Christian Brenneman, Orville, O.

I claim, 1st, The elastic gates, D D, constructed and used substantially as and for the purpose herein specified.

2d, The guide posts, A A, B B, and stop posts, H H, when used in connection with the elastic gates, D D, substantially in the manner and for the purpose specified.

71,273.—PEA SHELLER.—Wm. H. Bridgens, New York city.

I claim a combination of the box or frame, A, roller, R, portions, S S, of a hollow cylinder, and pins, P P, with or without a sieve, B, substantially as herein set forth.

71,274.—PIE RIMMER.—Neal N. Brown, Reading, Pa.

I claim the plate handle, A, with marker, a, at one end, and ears, B C, at the other, said ears being slotted, as described, securing the roller, E, by means of its journals and the roller, D, the whole being constructed and arranged together in the manner and for the purposes set forth.

71,275.—DITCHING MACHINE.—Clemens Bymer and John Imlay, Greensburg, Ind.

We claim, 1st, The wheel, F, with side flanges, F', and plough, G, in combination with the adjustable compressing plate, H, and spring, H2, substantially as described.

2d, The combination of the wheel, F, with side flanges, F', and the side cutters, I', substantially as described.

3d, The combination of the wheel, F, with side flanges, F', the side cutters, I', and the scraper and conveyor, K, substantially as described.

4th, The combination of the frame, A, caster wheel, B, and the adjusting mechanism consisting of the parts C, D and E, substantially as set forth.

5th, The combination of the frame, A, wheels, L, and axle, M, with the hinged rods, P, and the adjusting mechanism, consisting of the parts, O and N, substantially as set forth.

71,276.—STAVE MACHINE.—Francis O. Clark (assignor to himself and John E. Reininghaus), Benton's Port, Iowa.

I claim, 1st, The curved carriage, C, fitted into a channel of the table, B, in the relation to a dish saw, and flush with the top of the table, the said carriage and table constituting parts of a stave sawing machine, and the carriage being provided with head blocks, a clamping device, and the table with gages, all substantially in the manner and for the purpose herein described.

2d, The table, B, of a stave sawing machine, with a channel of curved form horizontally, and of a dove tail form vertically, cut down into it so as to form a depressed bed for the carriage, C, and also guides therefor, substantially as and for the purpose set forth.

3d, Jointing saws, mounted on inclined arbors, which are supported upon straight, moving-endwise, adjustable bearings, h h, which are operated by the devices shown, or the equivalents thereof, substantially as described.

4th, The jointing saws, mounted upon inclined arbors, which are supported upon straight, moving-endwise, adjustable bearings, h h, which are operated by the devices shown, or their equivalents, in combination with the vertically vibrating frames, j j, operated by the devices shown, or their equivalents, substantially as described.

5th, The combination of the straight, moving-endwise, adjustable bearings or frames, h h, carrying inclined arbors with jointing saws upon them, the toggle joint, formed of bent links, k' k', and the lever, k, for the purpose of adjusting the saws at any desired distance apart, without changing their angle of inclination, substantially as described.

6th, Providing for both adjusting the saws farther apart without changing their angle of inclination, and for changing the angle of inclination, when desired, in the one machine, by the means substantially as described.

7th, The adjustable clamp, e e', for accommodating one of the ends or different thicknesses of staves, in combination with the lever clamp, d', substantially as described

8th, Making the bilge block both removable and adjustable between the clamps, d' e', for the purpose of bilging different lengths of staves, substantially as described.

71,277.—STAVE MACHINE.—Francis O. Clark (assignor to himself and John E. Reininghaus), Benton's Port, Iowa.

I claim the curved beds, s s', formed in the table-top, B, in combination with feed rollers, n n', p p', supporting roller, o, and cutter head, r, arranged as described, for the purpose of dressing curved staves.

71,278.—PORTABLE FENCE.—James M. Clark, Lancaster, Pa.

I claim, 1st, The dog-stake and pin, D E', in combination with the movable brace, C, and post, A, when constructed and arranged as and for the purpose specified.

2d, In combination with the above, the rider, H, as shown and described.

71,279.—ADJUSTARLE SPIRIT LEVEL.—Patrick Clifford (assignor to himself and James Doyle), Holyoke, Mass.

I claim, 1st, The graduated index plate, g, having the angular notches, p p, and central conical opening, g', in combination with the tapering spindle, n, and spring detent, k, the whole arranged and operating substantially as set forth.

2d, The adjusting pin, a', and screw, b, in combination with the revolving level case, F, and stock, A B, substantially as described.

71,280.—LAMP.—Theodore Clough, Dobb's Ferry, N. Y.

I claim the two lateral air jet pipes, in combination with the wick tube, arranged substantially as hereinbefore described and shown, and for the purpose hereinbefore set forth.

Also, the combination of the wick tube, lamp reservoir, two air jet tubes, and the air supply tube, when arranged substantially as hereinbefore set forth so that the air supply pipe discharges into the upper part of the lamp reservoir, from whence the two air jet pipes receive their supply, whereby the top of the lamp is kept cool, and vapors and gases removed from the lamp reservoir and consumed.

71,281.—LAMP.—Theodore Clough, Dobb's Ferry, Greenburg, N. Y.

I claim, 1st, The combination of an air jet pipe with the wick tube of a lamp, when the air jet is so constructed and arranged as to be capable of discharging air under pressure, in a fine jet or jets, in the middle of the flame of the wick, just above the wick, substantially as described.

2d, The arrangement of the air jet pipe within the wick tube and lamp reservoir, when the reservoir is provided with a supply pipe, by which air is admitted to the upper part of the same, substantially as described.

3d, In combination with the air jet pipe and wick tube, an adjusting screw or its equivalent, whereby the position of the discharge aperture of the air jet pipe relatively to the wick and wick tube may be determined.

4th, The short tubular removable wick or section of wick, to be used with the stationary wick, substantially as described.

71,282.—BILLIARD CUSHIONS.—Hugh W. Collender, New York city.

I claim a new manufacture of strips for billiard table cushions, composed of layers of soft, vulcanized India rubber and two or more interposed layers of cloth, or other equivalent material, previously coated with India rubber, the whole united and together vulcanized, substantially as and for the purpose specified.

Also, as the second part of my said invention, vulcanized India rubber strips, for billiard table reversible cushions, of the form substantially such as herein described.

71,283.—WINCHES FOR CENTER BOARDS.—Henry V. Corbett (assignor to himself and Edgar S. Everts), Buffalo, N. Y.

I claim the windlass barrel, B B', and chains, D D', in combination with the center board, A, constructed, arranged and operating in the manner substantially as herein described.

71,284.—STEAMERS FOR COOKING.—M. C. Cronk, Auburn, N. Y.

I claim so constructing and arranging the tubes which pass through the several steamers, that various kinds of vegetables or meats may be cooked simultaneously without the fumes intermingling, as described.

71,285.—TRACE ATTACHMENT FOR WHIFFLE-TREES.—John W. Currier, Holyoke, assignor to himself and J. B. Gardiner, Springfield, Mass.

I claim the arrangement herein described for connecting the trace to the whiffle-tree, consisting of the combination of the parts, A and B, and spring, C, substantially in the manner and for the purpose herein set forth.

71,286.—BAG HOLDER AND FILLER.—Alonzo M. Darling, Davenport, Iowa.

I claim, 1st, The two distinct springs, F and G, sustaining and holding open the sack without fastenings, and leaving the space under the holder and around the sack free and open.

2d, The combination of a bag holder, as shown, with the turn table, B, all arranged substantially as and for the purposes set forth.

71,287.—PUMPS FOR FIRE ENGINES.—John N. Dennison and Roscoe J. Gould, Newark, N. J.

We claim the arrangement of rods, R S, in combination with the receiving or discharging valves of a pump, substantially as and for the purpose described.

71,288.—FIREPROOF SAFES.—Edwin A. Eaton and William Carlton Ireland, Boston, Mass., assignors to "Sanborn Steam Fireproof Safe Association."

We claim a water vessel for steam fireproof safes, in which the inlet and outlet tubes are constructed and arranged, and operate substantially in the manner and for the purpose set forth.

71,289.—CHURN.—Andrew N. Elzy, Placerville, Cal.

I claim a churn dasher with a central revolving shaft, B, carrying oblique arms, E, and square arms, G, alternating with each other and spirally arranged upon the shaft.

71,290.—TACK HAMMER.—Thomas Evans, Newark, N. J.

I claim a hammer head constructed with a socket, b, having openings in its, sides, with spur projections therein for securing the handle when driven into said socket, substantially as shown and described.

71,291.—SPOOL SUPPORT.—Jesse Fewkes, Newton, Mass., assignor to Silver Lake Manufacturing Company.

I claim a spindle, b, pivoted loosely within its frame, A, in combination with a pin, c, or equivalent device, substantially as and for the purpose set forth.

71,292.—WINDLASS CRANK POWER.—J. H. Flemming, Groton Township, Ohio.

I claim the handle, A, having a loop or ring, B, and lug, G, and pivoted to the shell, C, arranged in relation to the ratchet, E, operating with said loop or ring, and in combination with the pawl and ratchet, substantially as and for the purpose set forth.

71,293.—TANNING.—Charles Frank, Cincinnati, Ohio.

I claim the tanning process or operation substantially as described.

71,294.—PLASTIC MATERIAL TO IMITATE WOOD AND OTHER SUBSTANCES.—Wm. B. Gleason, Boston, Mass.

I claim as a new manufacture, articles made in molds and under pressure of the ingredients specified, with or without the use of oil, substantially as described.

71,295.—SEEDING MACHINE.—E. H. Goelet and E. B. Goelet, Goldsborough, N. C.

We claim, 1st, The construction of the scraper and leveler, K L, with slot, c, tooth, J, and covering teeth, d d, arranged beneath a hopper box, having apartments, G G', rotary distributors, b b', and hinged bottom, H, substantially as described.

2d, The scraper, K L, with its tooth, J, and coverers, d d, slot, c, and inclined guards, I I, arranged beneath a cotton seed and a guano distributor, so as to operate substantially as described.

3d, The application of a drill opener, a scraper and leveler, a cotton seed distributor, a coverer, and a roller, to a frame, A, which is mounted upon two wheels, when these wheels serve as drivers and markers, substantially as described.

71,296.—LUBRICATING COMPOSITION.—Charles A. Granley, Rutland, Vt.

I claim the combination of tallow, soft soap, sulphur, antimony, and alum, in the proportions or their equivalents set forth, and using it as a lubricator for journals.

71,297.—FIRE BACKS FOR GRATES AND STOVES.—John Habermehl, Wheeling, W. Va.

I claim, 1st, The fire back of an open grate or fireplace, constructed of a fire tile, grooved or cut partly through, for the purpose of withstanding the action of heat, in manner as herein described.

2d, A concave fire back, constructed of fire tile in sections, so formed as to point to one center, to resist the expansion of heat, as herein described.

71,298.—PACKING AMMUNITION IN CHESTS AND BOXES.—Francis L. Hagadorn, Baltimore, Md,

I claim, 1st, The system of flexible or adjustable partitions, together with the bolsters, as described, or their equivalents, arranged substantially in the manner and for the purposes herein set forth.

2d, In combination with the above, I claim the compound or dovetailed wedge, substantially as described.

71,299.—LOOM.—Williams Hainsworth, Philadelphia, assign or to himself and Amos Gartside, Chester, Pa.

I claim, 1st, In combination with a series of leaves of harness, the endless cords and pulleys, connected and operating as described for the above purpose.

71,300.—FIRE-PROOF PACKING FOR SMOKE OR HOT-AIR FLUES.—Joseph B. Harris, Germantown, Ky.

I claim, 1st, A safety jacket for surrounding or inclosing any metal flue for conducting smoke or heat, containing an annular air space or series of air spaces, and an annular space or series of spaces packed with the fire-proof material herein described, the same being constructed and arranged substantially as herein set forth.

2d, Also, in a safety jacket or shield, to prevent the conduction or radiation of heat from pipes, stoves, furnaces, or fires of any kind to adjacent combustible substances, an intervening space packed with the fire-proof material herein described, substantially as and for the purpose set forth.

71,301.—GANG PLOW.—James Harris, Santa Clara, Co., Cal.

I claim, 1st, The rocking bar, E, to which the plows are attached, and by which they are turned over upon the frame.

2d, The elevating lever, F, the adjustable seat, I, the gage screw, J, the adjusting screws, K K, the lever rest, M, in combination with the rocking bar, E, as described and substantially as set forth.

71,302.—SAW FILING MACHINE.—Pascal Hatch, East Corinth, Vt.

I claim the combination as well as the arrangement of the series of files, a a, their frame, B, and machinery for imparting to such frame vertical movements, as described, with the frame, A, the platform, C, or its equivalent, and the saw carriage, D.

Also the combination and arrangement of the single file frame, B, and its series of duplex files, or the equivalent thereof, with the frame, A, and its two saw carriages, D D', applied to such frame, A, substantially as described.

71,303.—APPARATUS FOR ELEVATING BY HORSE POWER.—Wm. H. Hawley, Utica, N. Y.

I claim attaching to and combining with the ordinary draft rope and pulley or pulleys, the supplemental rope, E, and pulley, C, for the uses and purposes mentioned.

71,304.—FASTENING TOPS TO BUGGIES.—Henry F. Holt, Fredonia, N. Y., assignor to himself, T. C. Abbott, and F. B. Parks.

I claim the described arrangement of the horizontal and vertical shanks and sockets at the sides of the top and seat, in combination with the shank hook and socket and spring key at the back of the seat, in the manner and for the purpose set forth.

71,305.—DINNER PAIL.—David Howarth, Portland, Me.

I claim the arrangement in a dinner pail made as described, of the removable compartment, b, at the top, and the adjusting wires, f, as and for the purposes set forth.

71,306.—BASE-BURNING STOVE.—G. G. Hunt, Bridgeport, Ct.

I claim, 1st, The single wall cylinder, R, extending above the laterally extended chamber, C, and terminated within the fire chamber, A2, in a double wall chamber, through which air is admitted to the fire, substantially as described.

2d, The single wall cylinder, R, terminating in a double wall air heating cylinder, within the chamber, C, in combination with the flues or pipes, F, leading into the chamber, S, substantially as described.

3d, The combination of cylinder, R, chambers, C g and A2, descending flues, F, and chamber, S, when these parts are constructed and arranged so that they will operate as herein described.

71,307.—ALLOY FOR DENTISTS' USE.—M. M. Johnston, New York city.

I claim the use of sodium or potassium, or an alloy of either or both, for purposes above mentioned, in the preparation of amalgam or cement for filling teeth.

71,308.—RAILWAY SWITCH.—Charles W. Jones (assignor to himself and J. S. Jardine), Philadelphia, Pa.

I claim a safety switch composed of vibrating rails, A and B, fastened together by means of mobile cross ties, D D, point rails, P R and P' R', lever, L, and spring, S P, the whole combined, constructed, and operated in the manner and for the purpose above set forth and described.

71,309.—WATER PRISM.—Bart Kane, Cincinnati, Ohio.

I claim, 1st, A water prism consisting of the flanged end plates, A A' B C D b c d, glass plates, E F G, metallic binding strips, H I J, and one or more necks, a, for the insertion of stoppers, K, the whole being arranged and operating substantially as herein described and for the purpose explained.

2d, Also the triangular shaped and double flanged plate, A B C D b c d, when provided with the neck, a, for the object stated.

71,310.—MACHINE FOR PRESSING REINS.—Geo. H. Kendall, Springfield, Mass.

I claim the combination of the rollers, A and B, having the grooves, F, and projection, G, with folders, C and D, the parts being arranged and constructed substantially as and for the purpose shown,

71,311.—FOOT FOR TUBS, BUCKETS, ETC.—Joseph W. Kendall, Philadelphia, Pa.

I claim a metallic removable foot for tubs, buckets, casks, etc., etc., arranged, constructed and applied in the manner and for the purpose above set forth and described.

71,312.—NECK YOKE FASTENING.—Henry J. Lamm, Richmond, Ind.

I claim, 1st, The combination of the socket, A, shank, C, and neck yoke, B, when arranged to admit of the swivel action at each end of the shank, substantially as described and for the purpose specified.

2d, The open screw, b, the end, d, having a head, e, and the nut, D, for obtaining a swivel joint, when used in combination with the yoke, B, and shank, C, substantially as set forth and for the purpose described.

3d, In combination with the socket, A, and shank, C, the rubber band, I, substantially as set forth and for the purpose described.

71,313.—SELF-LUBRICATING JOURNAL BOX.—Philander P. Lane (assignor to Lane & Bodley), Cincinnati, Ohio.

I claim the self-lubricating journal box having the oil chamber, E, below the bottom of the journal, and communicating with the journal at or near its midlength, by one or more apertures, F, and at or near the ends thereof, by ducts, G y G' g, to which the overplus of oil is conveyed by the channels, H H', substantially as set forth.

71,314.—ORGAN AND MELODEON COUPLING.—Conrad Ling and George S. Chandler, Detroit, Mich.

We claim the combination of the bar, B, the spring, C, the sounding board, D, the guides, E, the blocks, F, the dog, G, hung upon the fulcrum, H, the levers, J, the supporters or guides, L, the sticker pins, M, provided with shoulders, O, the cleat, P, in conjunction with the action frame, A, the keys, N1 N2, and a proper stop, all arranged substantially as described for the purpose designed.

71,315.—DOOR KNOB.—Aaron Longstreet, Chicago, Ill.

I claim, 1st, The knobs, A B, having shoulders, S S, fitted to operate against the outer ends of rosettes, D E, and having shanks, H I, passing through said rosettes, and secured by the metal, G G, put in the annular grooves, m m, substantially as and for the purpose set forth.

2d, The knobs, A B, having shanks, H I, in combination with the loose spindle, J, rosettes, D E, arranged and attached to a door as herein specified.

3d, The bub, F, having a recess, P, in combination with spindle, J, knobs, A B, and catch, K, as herein described.

71,316.—CORK SCREW.—Samuel McCoun (assignor to himself and Lafayette Farrington), Stamford, Conn.

I claim, 1st, A corkscrew provided with a bore or vent hole, substantially as and for the purposes herein specified.

2d, The combination of the rod, C, with a cork screw, provided with a bore or vent hole, b, substantially as and for the purposes herein specified.

71,317.—CAR SPRING.—George W. McMinn (assignor to himself and Robert T. Reiley), Cincinnati, Ohio.

I claim forming a spring of two plates of metal, each of which is folded to make two layers of the spring, and shaped at or near its midlength and inner end respectively to form the end eyes or loops, A' B', and lips, d d', of the spring, as described and for the purposes explained.

71,318.—BUTTER WORKER.—Wm. C. Moser, East Nantmeal Township, Pa.

I claim, 1st, The machine as a whole, when combined, arranged, and operated substantially as shown and described.

2d, The shaft, C, paddles, D, vibrating arms, E, squeezer roller, F, uprights, G, and the handle, H, substantially as shown and described.

71,319.—TOP-SPINNING SWORD.—Wm. Mullally, Boston, Mass.

I claim a toy constructed in manner substantially as above described.

71,320.—ADJUSTABLE MIRROR.—Louis F. Neagle, Philadelphia, Pa.

I claim the mirrors, A and C, adjusting rod, D, vibrating rod, c, head, b, rod, d, set screw, f, pin, g, head, h, plate, k, and the latch, m, when combined and arranged as set forth.

71,321.—ANIMAL TRAP.—Geo. J. Parham, Harrodsburg, Ind.

I claim the spring, E, trigger, C, grated cover, D, revolving trap door, B, spool, G, pulley, H, and cord, M, all arranged in the manner and for the purpose specified.

71,322.—MODE OF TUNING BELLS, ETC.—Andrew Patterson, Birmingham, Pa,

I claim the manner, substantially as hereinbefore described, of tuning bells, so as to secure from them a higher or lower tone.

71,323.—MACHINE FOR MAKING TAGS AND LABELS.—Thomas Percival, Augusta, Me., assignor to himself, John D. Defrees, and Rollin Defrees.

I claim, 1st, The use in a machine for making tags and labels, of the punches m m, and the dies, n n, with movable bottoms, the same to be used alone or in connection with an inking apparatus for printing letters, numbers, or devices upon the tags or labels, all constructed and operating in the manner and for the purpose substantially as described.

2d, The use of the inking apparatus, F, in connection with a machine for making tags and tags and labels, operating in the manner and for the purpose substantially as described.

3d, The combination and arrangement of parts of a machine for making tags and labels, all substantially as described.

71,324.—BRIDLE.—Joseph A. Putt, Marlboro, Ohio.

I claim, 1st, The peculiar arrangement and combination of the blind, A, iron, C, cheek piece, B, and pin, D, the whole being arranged in the manner and for the purpose herein specified.

2d, The holes, b b b, in the cheek piece, B, when used for the purpose of obtaining an interchangeable bridle, substantially in the manner and for the purpose specified.

3d, So constructing a bridle that it may be changed from a blind to an open bridle, and vice versa, without changing the check piece, in the manner herein described and for the purpose herein specified.

71,325.—CAR BRAKE.—George Quick and John N. Wallis, Fleming, N. Y.

We claim, 1st, The brake rod, A, levers, L and M, the stands, H I J K, when constructed as and for the purpose specified.

2d, The cam slide, C, and latch, V, and key, Z, when constructed in the manner and used for the purpose above set forth.

71,326.—MACHINE FOR DRESSING STAVES FOR BARRELS.—John J. Ralya, Allegheny City, Pa.

I claim, 1st, A swinging bar, r, in a stave dressing machine, carrying a pinion to operate in connection with a toothed rake attached to the ram, in combination with a support, x, to hold the pinion in gear, and tripper, s', and pin, z, to throw it in and out of gear respectively, or their mechanical equivalents, substantially as above set forth.

2d, Adapting the direction of the action of the knives of a stave dresser to the crookedness of the staves by a lever, x attached to the head stock, in combination with a rigid arm, e', attached to the journal which carries the knives, and with or without the springs, e", substantially as and for the purposes above set forth.

71,327.—HARVESTER RAKE.—S. C. Ridgaway, Baltimore, Md.

I claim the compound crank arm, I, and cam, G, in combination with the rake, B, when mounted above the platform, and arranged to operate substantially as and for the purpose set forth.

71,328.—SIFTING MACHINE.—John J. Rink, Brooklyn, N. Y.

I claim, 1st, The arrangemen of the elevator, e, with the strap work, h h' for the purpose specified.

2d, The combination and arrangement of the grates, o p, and the sifter, q, for the purpose specified.

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3d, The construction and arrangement of the levers, k k1 k2 k2, regulating the shutting or opening of the funnels, l l, for the purpose as stated and described.

71,329.—ROCK-DRILLING MACHINE.—Stillman W. Robinson and De Volson Wood, Ann Arbor, Mich.

We claim in rock drilling machines in which the drill has a rotary or feed movement, or both, the construction and arrangement of the cylinder so that its prolonged end may serve as a holder for the drill rod, or for driving the tool, and at the same time constitute one of the cylinder heads to receive the direct action of the motor, which thus produces the operation of drilling rock, etc., in the manner and for the purpose herein described.

Also the click, L, in combination with the ratchet, C (the latter forming the cylinder head), in the manner and for the purposes herein described.

71,330.—MACHINE FOR TEMPERING SAW PLATES.—A. J. Rockafellow, St. Louis, Mo.

I claim, 1st, The construction and arrangement of the carriage, B, and its cap, B', substantially as herein described and set forth.

2d, The setting guides, C, and in combination with these the set screws, c1, for the purpose of adjusting the distance between the cap and carriage to any required thicknes of plates.

3d, The cap, B, in combination with the rocking bar, d, and also with the rope and weight, E and E', substantially as described and set forth.

4th, The carriage, B, when combined with the links, a, and the cord or chain, b, and raising shaft, b1, or equivalent devices, whereby the carriage may be moved down into and up out of the bath tub in a diagonal direction, and still retain its horizontal position, substantially as described and set forth.

71,331.—MANUFACTURE OF SHOES.—Ichabod R. Rogers (assignor to himself, John Woolredge, and Geo. E. Bartlett), Lynn, Mass.

I claim connecting the upper leather at the toe and heel by means of a cord, a, to which the edges of the upper are secured by stitches, d, as herein described.

Also, in combination with the above, the sliding guide or traveller, C, with its eye, 8, for supporting the cord, a, in a central position, close to the bottom of the last, while the s itches, d, are being formed, substantially as set forth.

71,332.—LUBRICATOR FOR JOURNALS.—Morris Sellers, Keokuk, Iowa.

I claim the conical plug, D, in combination with the screw closing cap, E, substantially as described, and for the purposes specified.

71,333.—LAMP SHADE.—William F. Shaw, Boston, Mass.

I claim, 1st, The corrugated adjustable holder, B, as and for the purposes specified.

2d, The improved dome shade, when manufactured of the material and in the manner herein set forth and for the specified purposes.

71,334.—HORSE HAY FORK.—Joseph Shearer, Reading, Pa.

I claim the swivel, C, in combination with the lever, A, and operated by the arm, D, substantially as described.

71,335.—WATER WHEEL.—Henry W. Shipley, Portland, Oregon.

I claim, 1st, The combination of the parts, D E E', when constructed and arranged in relation to each other as shown and described.

2d, In combination with the foregoing, the arms or buckets, B, constructed and arranged as described.

3d, The gates, H, hinged at the outer extremities of the guides, F, and adapted to close inwardly, and provided with arms, i i, in combination with the links, f, and ring, G, when constructed and arranged in the manner and the purpose specified.

4th, In combination with the inwardly-closing gates, H and guides, F F, the water passages between the latter, when constructed so as to diminish in hight from their outer to their inner ends, substantially as and for the purpose specified.

71,336.—PLATE LIFTER.—James M. Smith, Center Sandwich, N. H.

I claim my improved plate lifter, as made of wire, and with three jaws, B C C', and two handles, A A', bent or formed from such wire, and arranged with respect to each other substantially as above described, and as represented in the accompanying drawings.

71,337.—STEAM-ENGINE PISTON VALVES.—Isaac Soule, Albany, N. Y.

I claim, 1st, The bushings, f f, constructed substantially as and for the purpose specified.

2d, The steam passages, arranged as described, with reference to the followers, e e, and bushings, f f, for the purpose herein set forth.

71,338.—COTTON-BALE TIE.—James R. Speer, Pittsburg, Pa.

I claim, 1st, A clasp for baling cotton, said clasp being provided with contracted apertures of the form herein described, and bent in the manner and for the purpose set forth.

2d, In combination with the above, I claim bands made of semi-oval iron and in detached sections, as herein described and for the purpose set forth.

71,339.—REAMING TOOL.—C. F. Sylvester and John Brooks, North Bridgewater, Mass.

We claim the expansive reamer, as composed of the slotted tool carrier, A, the series of cutters, a, the stationary cone, E, the adjustable cone, B, the screws, b and c, and the clamp nuts, C and G, and the shank, F, arranged, combined, and constructed in manner and so as to operate substantially as explained and represented.

71,340.—FENCE.—Asahel Todd, Jr., Pultneyvill, N. Y.

I claim, 1st, The bracket, C, in combination with the posts, A, and strands, C' C', constructed and arranged substantially as specified.

2d, The brace wire, G, in combination with the posts, A, brackets, C, wires, C' C', and pickets, I, arranged in relation to these parts as specified.

71,341.—ADJUSTING CUTTER HEADS TO PLANING MACHINES.—Chas. R. Tompkins, Rochester, N. Y.

I claim the application to rotary cutter heads of the revolving sleeve, c, with its screw, the shouldered shaft, h, and the nut, d, in connection with the pin and slot, g, or set screw, e, for the purpose herein set forth, and substantially as described.

71,342.—PARALLEL MOVEMENT.—Andrew J. Vandegrift, Cincinnati, Ohio.

I claim, 1st, The system of levers described, when arranged and operated substantially in the manner and for the purpose set forth.

2d, The tension rods described, or their equivalents, when arranged and operated in connection with the levers described, substantially in the manner and for the purpose set forth.

3d, The system of levers and tension-rods, combined with and attached to stocks or planes, A and B, or their equivalents, by the means, in the manner and for the purpose substantially as set forth and described.

71,343.—HORSE HAY FORK.—Peter Vanderbelt, Jr., Hughesville, Pa.

I claim the combination of slotted stem, A, arms, B, and elbow pieces, C, when constructed, arranged, and operating in the manner as shown and described and for the purpose set forth.

71,344.—FISHING REEL.—Julius Von Hofe, Brooklyn, E. D., N. Y.

I claim the bridge, j, in combination with the disk, b, shaft, f, cap, C, substantially as and for the purpose described.

71,345.—STOVE GRATE.—C. Waters and H. A. Brown, Poughkeepsie, assignors to Henry S. Giles, Troy, N. Y.

We claim, 1st, A front rest for a stove grate, having one portion arranged to open, in the manner and for the purposes set forth.

2d, The rest, in parts Nos. 1, 2, and 3, or their equivalents, in combination with the swivel joint.

3d, The rest, A, comprised of the parts, Nos. 1, 2, and 3, in combination with the cross bar, E, when the axis or end bearings are back of or one side of the center grate, B.

71,346.—INSECT TRAP.—Wm. Weaver, Phoenixville, Pa.

I claim the box, A, when provided with tubes, g g g, arranged and constructed as set forth.

71,347.—BASE-BURNING STOVE.—Charles M. Whelden, Pittsfield, Mass.

I claim, 1st, The air-passages, G, for conducting atmospheric air and discharging the same into the fire chamber of a stove or furnace at or near the surface of the fire, substantially as described.

2d, Also, the air-passages, G, in combination with the reservoir, D, substantially as set forth.

6d, Also, the gas pipe, I, (one or more,) or its equivalent, in combination with the reservoir, D, substantially as set forth.

4th, Also, discharging gases which collect in the reservoir, D, into the fire chamber at or near the surface of the fire by means of a pipe, I, or its equivalent, substantially as set forth.

5th, Also, conducting heated air from the air passage, G, and discharging it into the space or chamber below the grate by means of a pipe, J, or its equivalent, substantially as described.

71,348.—HOT-AIR FURNACE.—T. Whitaker, Bolton, and J. Constantine, Manchester, Eng.

We claim, 1st, Constructing stoves of hollow segments, open towards the inner side, forming, with the lining slabs, flues presenting a large absorbing surface for the heat, and a large outer surface for heating the air or liquids, and possessing great elasticity, substantially as described.

2d, Forming joints of stoves by ramming clay or other substances between ribs at the inner edges of the segments and metal plates retained by outer ribs cast on the sides of the segments, substantially as described.

71,349.—BREECH-LOADING FIRE-ARM.—Eli Whitney, New Haven, Conn.

I claim, 1st, The construction of the slotted and grooved tenon, B', on a double-barrel breech-loading shot gun, substantially in the manner and for the purpose described.

2d, The manner, substantially as herein described and shown, of constructing, arranging, and combining the stock, the lock, the barrels, the levers, and the slotted groovod tenon, B', for the purpose set forth.

3d, Pivoting the spring-extractors, G, which are constructed and arranged as described, at their rear ends, as and for the purpose set forth.

4th, The construction of the breech closers, b, and the hollow metallic lock frame, in the manner and for the purpose described, in combination with the reduced breech end of the sliding barrels, as described.

5th, The open slots, k k, in combination with the open slotts, j j, substantially in the manner and for the purpose described.

6th, The slotted and grooved tenon, B', attached firmly between the two barrels, B B, and connected to a forked frame, A, as A, and to two levers, C C', all substantially in the manner and for the purpose described.

71,350.—KEY GUARD FOR DOOR LOCKS.—John Wiard (assign or to himself and Thomas A. Conklin), New Britain, Conn.

I claim in the manufacture of locks, the employment of the spring, e, depression, k, in combination with the bolt, c, tumbler, d, substantially as and for the purpose described.

71,351.—MACHINE FOR MAKING METAL BOXES.—Jacob Wild (assignor to J. S. Mason & Co.,) Philadelphia, Pa.

I claim, 1st, The forming disks, S and T, arranged parallel to each other, caused to revolve in contrary directions, and to move from and towards each other by the aid of the mechanism herein described, or any equivalent to the same, for the purpose specified.

2d, The plate, B, on which the unformed box is deposited, in combination with the said forming disks and the appliances herein described, or their equivalents, for imparting an intermittent vertical reciprocating movement to the disks.

3d, The elastic arm, o, in combination with the cam, d', and the mechanism herein described, or its equivalent, for transmitting the motion of the said arm to the shaft, H, and its forming disk, T.

71,352.—BED BOTTOM.—Lewis Wilson (assignor to himself and Andrew Dunlap), Ovid, N. Y.

I claim, 1st, A spring bed bottom, the slats of which are suspended from rollers, B B, by means of strips of cloth, in combination with springs, g g, and the connecting straps, d d, arranged substantially as described.

2d, Securing the slats composing the bed bottom to strips of cloth, c c, attached by hooks, or their equivalents, to strips, a a, which are wound upon rollers, substantially as described.

71,353.—MANURE FORK.—Peter Yeugst, Union Deposit, Pa.

I claim the improved manure fork constructed and arranged with the handles, C C, adjustable by the blocks, d d, down and up on the standard, B, and with the middle prong, G, shorter than the outer prongs, E E, substantially as and for the purpose herein specified.

71,354.—LAMP.—Henry Young, Cincinnati, Ohio.

I claim, 1st, The provision in a lamp burner of an air duct, F, so arranged as to admit a movement to or from the wick, substantially as stated.

2d, The arrangement of the air ducts or tubes, E F, and wings, I I, all constructed and applied in the manner described, and for the purpose set forth.

71,355.—REDUCING MANGANESE ORES.—C. Adams (assignor to himself and Henry R. Hains), Philadelphia, Pa.

I claim the reduction of the ores of manganese by carbureted hydrogen gas under pressure, in the manner described.

71,356.—LUBRICATING COMPOUND.—F. T. Allyn (assignor to himself and J. A. Rich), New York city.

I claim a lubricating compound, consisting of the ingredients in about the proportions set forth.

71,357.—ELASTIC ROCKERS FOR CHAIRS.—John Barron, Cincinnati, Ohio.

I claim the employment of elastic tubes or pipes in combination with chair and other rockers, substantially as and for the purpose here specified.

71,358.—ASH SIFTER.—G. W. Bishop (assignor to D. S. Trowbridge), Stamford, Conn.

I claim the combination of the sliding grate, C, inclined grates, D D, or their equivalents, lever, F, ash-box, B, and cinder box A, and cover, E, constructed and arranged substantially as herein specified.

71,359.—MUSICAL TABLET.—John Branique, New York city.

I claim the musical tablet provided with the movable note pegs, substantially as and for the purposes set forth.

71,360.—DIES FOR THREADING SCREWS.—George B. Brayton, Providence, R. I., assignor to himself, Solomon W. Young, J. W. Hoard, and Lyman A Cook.

I claim, 1st, A rotary die for cutting screws, in which the cutting surface is at varying distances from the axis or center of motion of the said die, so as to conform to the taper and varying dimensions of the screw blank to be cut, substantially as herein shown and set forth.

2d, A rotary cam die, in which the concave cutting surface is made tapering or of varying dimensions, so as to fit both the shank and taper end of the blank to be cut, as herein specified.

3d, The method herein described of cutting the screw-thread upon both the shank and taper end of a blank, by the employment of two or more rotary cam dies, constructed and arranged as specified, so that, while their centers of motion are fixed and unchanged, their cutting surfaces shall approach or recede from each other, to conform to the varying dimensions of the blank passing between them.

4th, In a rotary cam die, as herein described, I claim the combination with the tapering cutting surface of the cleaning space, k, substantially in the manner and for the purposes herein shown and specified.

71,361.—DENTAL DRILL.—H. F. Bryant, Marathon, N. Y.

I claim the construction and arrangement of the slotted tube, A, having side box, e, piston, a, with the rack, c, operating the pinion, d, sliding ring, f, and hollow handle, h, containing the spiral spring, as set forth, for the purpose specified.

71,362.—FILE CUTTER.—Geo. F. Card and Chas. A. Studley, Bridgeport, Conn.

We claim, 1st, The combination of the ball and socket joint, j and i, with the universal motion apparatus, u and v, when they are constructed, combined, and fitted to feed and to adjust the blank, substantially as herein described and set forth.

2d, The combination of the hammer, N, chisel, f, and spring, P, when they are constructed, connected, and fitted to produce the result, substantially as herein described and set forth.

3d The combination of the worm, K, and wheel, G, and, r r, with the pinion, s, screw, H, and segmental nut, y, when they are constructed, combined, and fitted to feed the blank, substantially as herein described and set forth.

4th, The combination of the turn table with the feeding and blank-holding apparatus herein described, when constructed and fitted to govern the cut, substantially as herein set forth.

5th, The combination of the turn table and holding device with the anvil, j, and ball, p, and its appendages, when they are constructed, combined, and fitted for use, substantially as herein described and set forth.

71,363.—CASTER FOR FURNITURE.—L. Frederick Cerf, New York city.

I claim the fixed supporting lug, H, upon one side of the sleeve, B, and between the caster arms, C C, as herein described, for the purpose specified.

71,364.—ANIMAL TRAP.—J. W. Churchill, Pittston, Pa.

I claim, 1st, The pivoted passage, H, arranged in relation with the two boxes, A B, the door, C, and the two holes, d e, in box, A, substantially in the manner as and for the purpose set forth.

2d, The hinged platform, E, counterpoised as shown, and provided with the rod, i, in combination with the pendent rod, I attached to the passage, H, and the bent lever, D, to which the door, C, is attached, all being arranged to operate in the manner substantially as and for the purpose specified.

3d, The platforms, b c, in combination with the two holes, d e, and the passage, H, substantially as and for the purpose set forth.

71,365.—SASH-CORD FASTENER.—J. Correja, Brooklyn, N. Y.

I claim the sash cord fastener formed of the socket, c, for enclosing the knot, combined with the tubular cord-holder, e, upon one side, and adapted to being applied to the sash, in the manner specified.

71,366.—HAY RAKER AND LOADER.—Ezra N. Curtice, Spring Water, N. Y.

I claim, 1st, The spout or hopper, E, and rollers, D D', operated in manner and for the purposes substantially as above set forth and described.

2d, The curved slot, F, spring, f, and sliding bar, G, in combination with the rollers, D D', in manner and for the purposes substantially as above set forth and described.

3d, The sliding bar, G, metal scraper plate, I, in combination with the spout or hopper, E, in manner substantially as above set forth and described.

4th, The spout or hopper, E, having the axle, a, of the carrying-wheels, A, journalled in the ears, e, in manner substantially as above set forth and described.

5th, The rods, K K and L L, in combination with the bed pieces of the rack, I', or any equivalent method of attaching the elevator to the wagon, in manner and for the purposes substantially as herein set forth and described.

71,367.—COVERING FOR PLASTERED WALLS.—Abbot R. Davis, Cambridge, Mass.

I claim the within-described covering for plastered walls, consisting of sheets of wood as a substitute for ordinary house paper, or paper hangings, substantially as set forth.

Also, saturating the sheets of wood previous to applying them to plastered walls, substantially as and for the purpose set forth.

71,368.—STOVE DAMPER.—E. T. Duke, Plattsmouth, Nebraska.

I claim the triangular guards, E, constructed as described, attached at e e' to the rings, B, as herein set forth, for the purpose specified.

71,369.—BELT SHIFTER FOR ROVING MACHINE.—Jabez Edwards, Lowell, Mass.

I claim, 1st, the plate, m, and belt guide plate, j, with inclined slots, or their equivalents, substantially as and for the purpose set forth.

2d, The rod, q, and stud-slide, t, with stud, u, for the purpose substantially as herein described.

3d, The combination and arrangement of the plates, m and j, with inclined slots, k and l, or their equivalents, rod, q, and stud slide, t, with stud, u, when operating substantially for the purpose described and set forth.

71,370.—DIVIDER.—Edwin S. Fisher, Boston, Mass.

I claim the dividers, constructed as described, consisting of the leg, A, having the ark-shaped arm, C, and the small hinged leg, D, when the leg, A, is adapted to form a punch to be struck by a hammer, as herein shown and described.

71,371.—BOBBIN.—Charles H. Fiske Lowell, Mass.

I claim a filling bobbin, whose sides, for a greater or less portion of its length, are formed to resemble a succession of inverted truncated cones, substantially as described, for the purpose specified.

71,372.—POST-DRIVER.—C. T. Fitch, Harbor Creek, Pa.

I claim the posts, B, hinged by the joints, a, to the runners, A, when adjusted in any required position, by means of the staples and pins, d, passing through the slotted lower end of the hinged brace, C, as herein described for the purpose specified.

71,373.—PERMUTATION LOCK.—Chas. Flesch, Rochester, N. Y.

I claim, 1st, The combination of the weight, H, with the fly, m, of the lever, G, and the wheels, C C C, operating in the manner and for the purpose substantially as herein set forth.

2d, The combination of the cam hook, n, and eccentric surface, o, with the fly, l, of lever, G, operating substantially in the manner and for the purpose set forth.

3d, The combination and arrangement of the conical or tapering screw pin, u, with the flattened side of the spindle, B, operating in the manner and for the purpose set forth.

4th, The employment of the intermatching teeth, e e', in combination with the clamping plates, w w', and screw, y, arranged and operating as specified.

71,374.—TOY FORTUNE-TELLER.—Charles T. Ford, Salem, Mass.

I claim, 1st, Placing the prophetic sentences upon the periphery or face of a revolving wheel, substantially as and for the purpose specified.

2d, Employing spring mechanism to bear down the arms of the figure of a fortune-telling toy, substantially as shown, and for the objects specified.

3d, The readle, T, or other equivalent device, for lifting the brake, m, from the wheel, substantially as and for the purpose shown and described.

4th, The scrolls or cards, K, with questions and answers thereon, lettered and numbered, substantially as shown and described, in combination with the numbers on the wheel, B, as and for the purpose set forth.

5th, The holes, L, in the base, A, in combination with the wheel, B, of a fortune telling toy, substantially as and for the purpose shown and described.

6th, The rubber brake, m, substantially as and for the purpose of stopping a toy wheel, all as set forth.

71,375.—GAS METER.—David Forrest (assignor to himself, P. M. Keane, and D. N. Clark), Eastport, Me.

I claim, 1st, The central tube, B, and the gas wheel, A, constructed and arranged substantially as shown and described.

2d, The elastic disk, g, and the spring, h, on the periphery of the gas wheel, and in combination therewith the catch, J, substantially as and for the purposes set forth.

3d, Revolving the gas wheel, A, and registering or recording the amount of gas consumed, by the action of a spring operating suitable gearing for that purpose, substantially as herein shown and described.

71,376.—PLOW.—Charles Forster, Lebanon, Pa.

I claim, 1st, Forming recesses, c1 c2, in the standard, C, or forward end of the mold board, D, to receive the flange, e1, and tongue, e2, formed upon the forward end of the land side, E, substantially as herein shown and described, and for the purpose set forth.

2d, Forming a recess or groove, e3, in the outer side of the flange, e1, of the land side, E, for the reception of the projection, f' formed upon the inner side of the rear part of the cutter, F, substantially as herein shown and described, and for the purpose set forth.

71,377.—PRESERVING ANIMAL AND VEGETABLE SUBSTANCES.—John Gamgee, Bayswater, England. Arthur Gamgee, Edinburgh, Scotland.

We claim, 1st, The use of carbonic oxide in the process of preserving animals whose fleshs to be used as human food, whether by causing animals to inhale carbonic oxide gas as they die, or by placing the meat in chambers or vessels containing carbonic oxide alone, or in conjunction with other gases or vapors.

2d, The use of charcoal saturated with sulphurous acid or other antiseptics, in conjunction with carbonic oxide and other gases or vapors, for the preservation of animal substances.

71,378.—FUNNEL.—James Gondouin (assignor to himself and Felix Aumerle) New York city.

I claim the funnel, a, and valve, d, in combination with a float, g, latch, l, and block, n, substantially as and for the purposes set forth.

71,379.—CORN PLANTER.—James M. Gordon and E. Christianson, St. Joseph, Mo.

We claim, 1st, The combination of the lever, K, gear-wheel, J, sleeve, H, and clutch and band pulley, G, with the cross bar, F, and axle, E, substantially as herein shown and described, and for the purpose set forth.

2d, The combination of the band, M, pulley, N, shaft, O, and wheels, T, with each other, and with the pulley, G, and seed-boxes, P, substantially as herein shown and described, and for the purpose set forth.

3d, The combination of the markers, W, with the shaft, O, and wheels, T, substantially as herein shown and described, and for the purpose set forth.

71,380.—CEMENT STOVE PIPE THIMBLE.—Henry Goss, Union Mills, Pa.

I claim a composition or cement stove pipe thimble, A, cast in a permanent mold or frame, B, as a new article of manufacture, substantially as described.

71,381.—BEEHIVE.—Arthur Gray, Reiley, Ohio.

I claim, 1st, The case, C, when placed within the case, A, and resting upon the inclined bottom, B, to form the chamber, c, surrounding said case, C, through which chamber the air passes from the openings, d, in the bottom, B, to the openings, e, in the top, a, affording constant ventilation, as herein shown and described.

2d, The adjustable slides, F, fitted in the guide, g, constructed as described, having notches, h, upon their lower sides, and the long notch, i, upon their upper sides, registering with the notches, f, in the hive, as herein described for the purpose specified.

71,382.—BUTTON-FASTENER.—Robert B. Griffin, Jr., Baltimore, Md.

I claim my improved button-fastening device, formed of a coiled ring, arranged to pass through the cloth and the eye of the button, and combined with a retaining base, substantially in the manner and for the purpose herein set forth.

71,383.—KILNS FOR CHARRING WOOD, ETC.—William H. Guignon, and William D. McDonald, Warren, Pa.

We claim, 1st, A kiln, for charring or carbonizing wood or coal, which is self-acting or automatic in its operation, substantially as described.

2d, A portable kiln, for carbonizing wood or coal, which is formed of a double wall, or an outer and an inner shell, whereby the heat is confined in the kiln, substantially as shown and described.

71,384.—ROTARY STEAM ENGINE.—A. S. Harlan, Bloomington, Ill.

I claim, 1st, The arrangement of the flaps, E E, so as to slide in grooves from one side of the induction ports to the other, in order to reverse the engine, substantially as described.

2d, The arrangement of the eduction ports, S, of the cylinder, so as to release the steam after a semi-revolution of the piston, substantially as herein set forth.

71,385.—RAILROAD CAR VENTILATOR.—Charles H. Haskins, St. Louis, Mo.

I claim, 1st, The use of an eaves trough, or its equivalent, to hold the water when raised, allowing it to fall in sheets or drops in quantity as required, and for the purposes set forth.

2d, The combination of the wind mill, the worm or screw pipe, and the eaves trough, or their equivalents, substantially as described, for the purpose herein set forth.

71,386.—ROOFING.—R. P. Henry, Akron, Ohio.

I claim the vertical strips or breakwaters, D, fitted in grooves in the boards or planks, B, and projecting above the upper surfaces of the same, in connection with the battens, E, substantially as and for the purpose set forth.

I further claim the combination of the battens, E, strips, C, and breakwaters, D, all arranged and applied to the boards or planks, B, substantially as and for the purpose specified.

71,387.—CLAMP FOR PLANKING SHIPS' SIDES OR FLOORS.—John J. Hill, Sodus Point, N. Y.

I claim the serrated segmental swinging arms, C c, when attached to bar, A, and constructed to operate with screw, B, in the manner substantially as described.

71,388.—STOVE COVER LIFTER.—George W. Hunt, Winchendon, Mass., assignor to Washington Whitney and I. J. Dunn.

I claim, as a new article of manufacture, the lifter, when constructed substantially as described.

71,389.—WINDING WATCH.—Charles E. Jacot, Chaux-De-Fonds, Switzerland.

I claim, 1st, The wheel, 10, connected with the wheel, m, and fitted so as to be moved into gear with the wheel, x, in the manner and for the purposes set forth.

2d, The pin on the wheel, f, taking loosely into an opening in the flange or disk of the arbor of the minute hand, for the purposes and as set forth.

3d, The lever, y, and spring, 12, applied as set forth, in combination with the stud, 11, and swinging-gear carrier plate, k, substantially as and for the purposes set forth.

4th, The pawl, 15, made in one piece of metal with its curved spring, in combination with the plate, c, against the edge of which said curved spring lies, as and for the purposes set forth.

71,390.—MANUFACTURE OF PAPER VESSELS.—Augustus Jennings, and Isaac Jennings, Fairfield, Conn.

We claim forming and drying the paper to form the vessel or other article over hollow metallic formers of the desired shape, heated by steam or hot air introduced into their interior, substantially as herein shown and described.

71,391.—CAR BRAKE.—Thomas A. Kelley (assignor to himself and William G. Wilson), Cleveland, Ohio.

I claim, 1st, The brake-setting mechanism, consisting of the cam, b', with its V-shaped shoulder, the eccentric, b, with its V-shaped projection both upon the axle of the car, the lever, c, connecting bar, h, slide, h', with its notch, dog, k', with its tooth, chain, r,' and spring, A, in combination, substantially as described.

2d, The letting-off mechanism, consisting of the lever, l, with its bail, m, dog, k', with its tooth, the slide, h', with its notch, the chain, r', and the tempered spring, A, substantially as described.

71,392.—RAILWAY CAR BRAKE.—Johnson Kitchen, William Kitchen, and Samuel Samuels, Accrington, England.

We claim the screw shaft, G, with its nut, e, arranged and operating on a car or truck, in combination with the shaft, H, its arm, I, connected to the nut, e, and its arms, a a, connected to the brakes of the car, as set forth.

71,393.—HOISTING APPARATUS.—William H. Kuntz, Mount Rock, Pa.

I claim the slide, as constructed, combined and operated with the rope, as herein described, and for the purpose set forth.

71,394.—VELOCIMETER.—Edward A. Lewis, St. Charles, Mo.

I claim the use of one or more eccentrics, with intermittent rotation, regulated by connecting clock work and other appropriate mechanical devices, as gear wheels, springs, etc., for indicating, at repeated intervals of time, the rate of speed of running machinery in such intervals, while such machinery continues in motion.

In combination with a velocimeter thus constructed, I claim a lock, which may indicate the time of day in connection therewith, substantially as set forth.

71,395.—FLOUR BOLT.—Spencer Lewis, Tiffin, Ohio.

I claim, 1st, A bolting cloth, applied to a sliding frame, and arranged within a bolting reel, which is covered with bolting cloth of different degrees of fineness, for producing different grades of flour at pleasure, substantially as described.

2d, The hammers, g secured to crank shafts, the cranked ends of which play in slotted arms, h', upon longitudinally sliding spring rods, J, in combination with an adjustable cam plate, S, upon the inside of the bolting chest, all constructed, arranged, and operating substantially as described.

3d, The adjustable screw pulley, r, applied upon a stud, p, and provided with cord, N, for adjusting the cam plate, S, substantially as described.

71,396.—LAMP CHIMNEY CLEANER.—John H. Lightner, Shirleysburg, Pa.

I claim an implement for cleaning lamp chimneys, formed of spring bands, A, fixed at each end to a center stem, B, in combination with the slide or collar, E, substantially as and for the purpose described.

71,397.—NURSERY CHAIR.—Mrs. Caroline M. Loring, and Ezekiel Averill, Charlestown, Mass.

We claim the combination of the stool, a, and chair, having the several parts arranged substantially in the manner as described and shown.

71,398.—PAPER BAG.—David Manuel, and Calvin F. Manuel, Boston, Mass.

We claim the triangular paper bag, constructed as described, by folding the sides, d e, one upon the other, of the parallelogram, cut with the apex, a, as shown in fig. 1, in the lines, i c, and i b, upon the triangular center described by the lines, a b a c, and b c, and by folding the apex, a, over the said folded sides, e d, as herein set forth, for the purpose specified.

71,399.—HEATER.—J. A. Marvin, Red Wing, Minn.

I claim, 1st, The evaporating vessel, E, suspended in the central opening, F, of the drum, C, by means of a rod from the top of the drum, said rod bearing the register, as herein described, for the purpose specified.

2d, The arrangement of the annular drum, C, supported within the radiator, D, by the pipes, g, said radiator resting upon the stove, A, driving-flue, J, pipe, H, tube, m, evaporating vessel, E, register, O, and hot air pipes, n, as herein shown and described.

71,400.—STEAM GAS GENERATOR.—Hiram S. Maxim, New York city.

I claim, 1st, An apparatus for generating gas by steam from gasoline, naph-

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tha, benzine, or other hydrocarbon oils, where the flow of the steam into the generator is governed and controlled by the pressure of the gas so generated.

2d, In combination with a steam gas generating apparatus, the screen, J', substantially as and for the purposes described.

3d, In combination with a steam gas generating apparatus, the superheating tube, C, and the interior supplementary tube, t, substantially as and for the purposes herein shown and specified.

71,401.—MACHINE FOR PLANIG AND SLOTTING.—Charles A Meinhard, Fort Wayne, Ind.

I claim, 1st, The combination of worm wheel, D, with the sliding adjustable plate, C, and up-and-down adjustable plate, G, all made, arranged, and operating substantially as and for the purpose herein shown and described.

2d, The cutter, L, when hinged in the slotted stem, K, and connected with the spring, m, substantially as and for the purpose herein shown and described.

3d, The adjustable plates, J or J', when provided with shanks, i i, respectively, for holding the tool, and when combined with the up-and-down adjustable plate, G, of a planing machine, substantially as set forth.

4th, The shafts, B and E, worm, F, plate, C, disk, D, and plate, G, in combination with the plate, J or J', stem, k, and cutter, L, all made and operating as and for the purpose herein shown and described.

71,402.—BUNG EXTRACTOR.—Felix Miller and Hypolite Perrot, New York city.

We claim the lever, A, with a circular cavity, n, at its end, in combination with the strap or bow-shaped lever, B, hinged to said lever, A, the whole being constructed and operating in the manner and for the purpose substantially as set forth.

71,403.—IMPROVEMENT IN PLANING MACHINE.—Edward Myers (assignor to Lane & Bodley), Cincinnati, Ohio.

I claim the method herein described of attaching the matcher head, C, to its mandrel by means of the screw rod, D, passing centrally through the matcher head, and screwed into the collar, B, one of whose ends is provided with the pin, E, fitting into the inner part of the said matcher head, substantially as set forth.

71,404.—CARRIAGE SHAFT AND POLE COUPLING.—Earl C. Newton, Batavia, Ill.

I claim, 1st, The application of the lever, B, to the shaft iron, D, through the hole, C, and F, as herein described.

2d, The application of the spring, G, to the slide iron or lever, B, in the manner and for the purpose set forth.

71,405.—BEEHIVE.—Lucius M. Olden, Pana, Ill.

I claim the baked earthenware or stoneware beehive, furnished with comb frames, and constructed substantially in the manner herein described and shown, as an improved article of manufacture.

71,406.—WAGON.—Henry Parker, Leesburg, Miss.

I claim the round revolving axle, with its attachings all combined, substantially as and for the purpose described.

71,407.—MEDICAL COMPOUND.—Samuel Payne, Louisville, Ky,

I claim a medical compound, formed of the ingredients substantially as and for the purpose described.

71,408.—CAST IRON CAR WHEEL.—George Peacock, Selma, Ala.

I claim, 1st, The combination of the curved plate, c, with the gradually diminishing arms or spokes, a a, substantially in the manner and for the purpose specified.

2d, The cast iron wheel above described, having the deep arms, a a, with openings between them around the hub, the curved plate, c, attached to the arms, a a, as shown, and united to the inner edge of the rim or tread, and the supporting brackets, a' a', all combined and arranged substantially as and for the purposes set forth.

71,409.—JACK GENTER FOR SPINNING MACHINE.—Francis R. Pearson, Germantown, Pa.

I claim, 1st, The combination of worm wheel, p, and dog, z, as described, for the purpose set forth.

2d, The combination of worm wheel, p, dog, z, catch, r, and oscillating stand, m, as described, for the purpose set forth.

3d, The combination of the wheel, p, catch, s, lever, O, and shifter bar, t, or an equivalent arrangement of the same, as described, for the purpose set forth.

71,410.—SAFE DOOR BOLT.—John K. Pierson, Newark, N. J.

I claim arranging the bolts in safes having double doors so that they extend across the door and can be locked at once into the opposite door and into the casing two or more bolts being provided in each door and operated at once from the lock, substantially as and for the purpose herein shown and described.

71,411.—DOOR LOCK.—E. P. Porter and G. W. Hallett, Waterford, N. Y.

We claim the combination with the catches, H, of the levers or "lift-ups" P2, or their respective equivalents, when combined together substantially as and for the purpose described.

Also the slides, A2, either one or more, substantially as and for the purpose specified.

71,412.—ELASTIC REIN PULL.—J. G. Pugsley, N. Y. city.

I claim an elastic rein pull adapted to being grasped by the hand and interposed between the hands and the reins, as and for the purposes set forth.

71,413.—MECHANISM FOR THREADING SHUTTLES.—Lewis Ripley, North Chelmsford, Mass.

I claim the combination of the cylinder, A, piston, B, tubular rod, C, spiral spring, D, and elastic mouth piece, e, constructed and arranged to operate as herein shown and described.

71,414.—UTERINE SUPPORTER.—A. C. Rohleder, N. Y. city.

I claim a support for the *os uteri* composed of the spring, a, and flexible membrane, B, either with or without the central perforation, substantially as described for the purpose specified.

71,415.—DRAFT ATTACHMENT FOR HORSES.—Elias Sanford, Meriden, Conn.

I claim, 1st, The whiffletrees, D, connected by a swivel joint to the curved bar, A, when such whiffletrees are removably pivoted to the side of the hames, e, as herein described for the purpose specified.

2d, In combination with the curved bar, A, whiffletrees, D, and hames, e, the tongue, B, when provided with the elastic block, b, substantially as described for the purpose specified.

71,416.—CARPENTERS' HATCHET.—John T. Shank (assignor to himself and Jonathan Strine), Martinsburg, Va.

I claim the construction of the arched nail drawer, C, with its slot, E, at the top of the hatchet, B, as herein described and for the purposes set forth.

71,417.—RAILROAD RAIL.—George V. Sheffield and Byron Whitcomb, Worcester, Mass.

We claim, 1st, A reversible double rail for railways, made substantially as herein shown and set forth and for the purposes specified.

2d, The combination with the ends of two rails, as described, of the central splice or connecting piece, E, substantially as and for the purposes set forth.

71,418.—TELEGRAPH INSULATOR.—W. Edgar Simonds, Hartford, Conn.

I claim the insulator, B, having the inverted lip, c, in combination with the cup, d, the india-rubber hood, g, and the supporting peg, A, constructed and arranged substantially as described.

71,419.—PLOW.—Samuel S. Starnes, Macomb, Ill.

I claim, 1st, The combination of the standard, b, spring, d, rod, l, and beam, a, substantially as and for the purpose described.

2d, The combination of the lever, h, rack bar, k, and plow beam, a, substantially as and for the purpose described.

71,420.—CRACKER-MAKING MACHINE.—David Stewart, Philadelphia, Pa.

I claim, 1, The mechanical combination of fluted rollers, C and C', roller R R' R'' and R''', double set of endless leathern or other suitable material bands, S B S B and S' B' S' B', running symmetrically in opposite directions, for the purpose and in the manner above set forth and described.

2d, The combination of fluted rollers, C F, with concave box, C B, drawn from different centers, for the purpose and in the manner above set forth and described.

3d, The combination of rollers, C and C' R R' R'' R''', endless band, S B and S' B', roller, C F, and concave box, C B, all constructed and operated in the manner and for the purpose above set forth and described.

4th, Sliding top frame (wooden or otherwise), S T, and knife, K, combined, constructed and operated in the manner and for the purpose above set forth.

5th, The combination of rod and claw stoppers, 33, with weight rod, 34, weight, 35, constructed and operated in the manner and for the purpose above set forth and described.

6th, The rest or horizontal strip, 41, with elbow, 40, constructed and operated in the manner and for the purpose above set forth and described.

7th, Spring lever, L V, eccentric weight log, 42, combined with rest, 41, and elbow, 40, constructed and operated in the manner and for the purpose above set forth and described.

8th, The combination of frame, M F, disk, C A, and forks, f f f, with slides, 1 T and 1 T', constructed and operated in the manner and for the purpose above set forth and described.

9th, The application to elbow of rod, r d r d, of weights, W W W, for the purpose above set forth and described

10th, Cushion block, B L, combined with the fork arrangement, and constructed and operating in the manner and for the purpose above set forth and described.

11th, The combination of bar, B A R, with eccentric, E X and E' X', and shaft, P A, constructed and operated in the manner and for the purpose above set forth and described.

12th, Bar, B' A' R', combined with its eccentrics, E'' X'' and E''' X''', and shaft, P' A', constructed and operated in the manner and for the purpose above set forth and described.

13th, The combination of springs, S P, on uprights, V'', bar, B A R, and its square-keyed end, constructed and operated in the manner and for the purpose above set forth and described.

14th, Sieve box, B X, and flour sieve tin cup, T C, combined with spring and cam, C S P, constructed and operated in the manner and for the purpose above set forth and described.

15th, A cracker-making machine being the combinntion of all the different parts and pieces above separately claimed, constructed and operated in the manner and for the purpose above set forth and described.

71,421.—COOKING STOVE.—Hamilton Stickney, Reno, Pa.

I claim, I. The construction of the oven, C', formed by the circular slides, a, around the furnace, as herein described for the purpose specified.

2d, The stove, A, constructed as described and provided with the air openings, e', forming a communication from the oven, C', through said furnace to the annular flues, i, and bread oven, E, as herein described for the purpose specified.

3d, The flues, f f', and the air passages, J i i, and the revolving shelves, m m, in the elevated oven, E, arranged relatively to the fuel supply chamber, B, and operating substantially as shown and described.

71,422.—AXLE BOX FOR CARS.—William Stone, Hollidaysburg, Pa.

I claim the sliding lid, B, with the shoulder projection, e, on the under side and the hooked head, b, in combination with the lugs, a a, on the sides and the projection, c, on the top of the box, A, with its sloping side, d, arranged and operating substantially as herein described.

71,423.—REFRIGERATOR CAR.—J. B. Sutherland, Detroit, Mich.

I claim the double-walled, double-roofed, double-floored car having ice chests, A, at each extremity closed by the hanging flaps, B, substantially as above described having spaces, S and F, arranged so as to produce a constant circulation of the air in the car, in manner substantially as and for the purposes above set forth and described.

71,424.—ARTIFICIAL LEG.—Charles Swett, Vicksburgh, Miss.

I claim, 1st, The flat vertical spring, c, combined with the horizontal rubber cushion, m, the leg, A, and foot, B, arranged and operating substantially as and for the purposes herein described.

2d, In combination with the above, I claim the elastic cushion, n, substantially as described for the purpose specified.

71,425.—ENGINES FOR THE USE OF STEAM AND AIR COMBINED.—John Blake Tarr, Chicago, Ill.

I claim, I. Reheating or superheating steam after it has left the generator by means of highly-heated air introduced into the steam chest under considerable pressure, substantially as described.

2d, Applying steam and air within the valve chests or cylinders of engines by introducing air into said cylinders when the air is heated to a temperature equal to or greater than that of the steam, substantially as and for the purpose described.

3d, The steam pipe, D, and hot-air pipe, D1, communicating with the valve chest of an engine and provided with suitable valves for alternately shutting off and letting on the steam and air, substantially as described.

71,426.—LIQUID FOR BLEACHING AND REMOVING STAINS.—Maria E. Tompkins, Brooklyn, N. Y.

I claim the improved bleaching fluid composed of the ingredients and in the proportions substantially as herein described.

71,427.—KEY BOARD ATTACHMENT FOR MUSICAL INSTRUMENTS.—Eben Tourjée, Providence, R. I.

I claim the employment or use of springs, or their equivalents, applied to the key board of a musical instrument and arranged in connection with the keys thereof, to operate in the manner substantially as and for the purpose specified.

71,428.—GAS CIGAR LIGHTER.—J. W. Tracy, St. Louis, Mo.

I claim the figure, a, attached by the flexible tube, c, to the gas pipe, b, in combination with the elastic cord, f, operating on the weighted lever, e, in the manner and for the purpose substantially as shown and described.

71,429.—MACHINE FOR ORNAMENTING BUTTONS.—John Tunnicliff and Patrick Cahill (assignors to A. P. Critchlow), Northampton, Mass.

We claim, 1st, The rotary mandrel, G, fitted in movable bearings, J J', and provided with squares, K K', in combination with the adjustable roller, f, connected with a sliding bar, L, on the head, C, all arranged to operate in connection with the cutter, F, substantially in the manner as and for the purpose set forth.

2d, The lever, M, provided with the adjustable roller arm, N, in combination with the bevelled notch, i, in the sliding bar, L, and the mandrel, G, fitted in movable bearings, J J', substantially as and for the purpose specified.

7 ,430.—BURNER FOR LOCOMOTIVEHEAD LIGHTS.—Aaron C. Vaughan, Philadelphia, Pa.

I claim, 1st, The perforated casing, m, shield, M, and intervening space between the two.

2d, The openings, t, in the shield, M, for the purpose specified.

71,431.—HEAD LIGHT FOR LOCOMOTIVES.—Aaron C. Vaughan, Philadelphia, Pa.

I claim, 1st, The combination of the burner of a locomotive head light, a parabolic reflector and a lens situated within or adjacent to the front edge of the reflector, substantially as and for the purpose described.

2d, The reflecting flaring ring, J, arranged in front of and concentric with the lens, as set forth.

71,432.—ELEVATED RAILWAY.—Sylvanus Warren and William M. Blume, New York city, assignors to themselves and A. V. Briesen.

We claim, in combination with a railway as above described, having the rails at the extremities of the arches, and the central guiding rail, the car truck, I, the central guide wheel and rods for supporting the car, as herein shown and described.

71,433.—CONSTRUCTING FURNACE DOORS.—Joseph Watson (assignor to himself and Solomon Drullard, Jr.), Buffalo, N. Y.

I claim, 1st, Constructing furnace doors of a single brick, A, in combination with an iron frame, B, substantially in the manner and for the purpose set forth.

2d, Also the manner of constructing the frame, B, with the wrought-iron cross bars, g g, and lugs, h h, for sustaining the brick and securing them in the frame, substantially as specified.

3d, Also constructing the door arch of a single crown piece, C, formed with an inclined back, l, and recess in front for and in combination with the iron plate, D, substantially as and for the purpose set forth.

71,434.—MACHINE FOR SCALING FISH.—Napoleon Bonaparte White, Cecil county, assignor to himself and Frederick B. Hoffman, Baltimore, Md.

I claim a hollow cylinder provided with blades or points, or their equivalents, projecting inwardly from its circumference or sides, when made to revolve and otherwise adapted to the purpose of removing the scales from fish, substantially as herein set forth.

71,435.—FRUIT BOX.—Henry B. Wilcox, Troy Mills, Pa.

I claim securing the bottom of a fruit box to its sides by means of flaps, a and b, which are formed respectively above and below the bottom by means of incisions into the sides of the box, substantially as and for the purpose herein shown and described.

71,436.—STAIRS.—Noris Adkins, Danbury, Conn.

I claim the combination of the step, a, hinge, b, and spring, c, forming an elastic hinge-spring step, constructed substantially as described and for the purpose set forth.

71,437.—HYDRAULIC CLOCK.—Onofrio Abbruzzo, St. Margherita, Italy.

I claim producing the regular motion of the hands of a clock by means of the regular and continuous rise and fall of water in a single vessel provided with a single intermittent discharging siphon and having a continuous influx of water which influx is in relation to the discharge in the ratio of one to two, substantially as described.

71,438.—HINGING CLOCK FRONTS.—Andrew Allen, New Haven, Conn.

I claim hinging clock fronts to the case, substantially in the manner and for the purpose herein set forth.

71,439.—COTTON AND HAY PRESS.—Barnabas B. Alfred, Lagrange, Ga.

I claim the combination of the follow block, D, and press box, B, with a compound screw, c c', resting on a pivot, i, and operating in such a manner that the part, c, screws up and down in the part, c', and the latter screws the press box, B, up and down at the same time causing the follow block and press box to move in opposite directions with the united velocity of both the outer and inner threads of the part, c', in the manner and for the purposes specified.

71,440.—FLOOR CLAMP.—H. D. Barnes, Fair Haven, Conn.

I claim the arrangement of the serrated plate, a, within the arm, C, combined with a corresponding serrated surface of the beam, A, and the set screw, H, constructed and arranged so as to secure the arm C, upon the beam, A, substantially in the manner herein set forth.

71,441.—LENSES FOR LANTERNS.—Edward Barrett (assignor to himself and John F. Burns), New York city.

I claim, 1st, The lens constructed with the cavity, A*, substantially of the form set forth, for the purpose specified.

2d, The combination of the opaque cover or back with the lens constructed as described whereby the lens may be used as a reflector, substantially as herein set forth.

3d, The combination with the within-described lens of the reflector, B, of flaring form, substantially as and for the purpose specified.

71,442.—KNIFE SHARPENER.—Albert B. Bean (assignor to Samuel C. Bradley and Lewis W. Upham), New Haven, Conn.

I claim the combination of the blocks, E and D, of the form described with their holder, C, when secured therein so as to be adjustable to present new edges, substantially as and for the the purpose specified.

71,443.—INKSTAND.—E. O. Bennett, Mount Pleasant, Iowa.

I claim the tube, B, made in the manner and used for the purpose herein described.

71, 44.—LANTERN.—Lewis F. Betts, New York city.

I claim, 1st, Connecting the dome of the lantern with the guards by the intermediate extension piece, c, substantially as recited.

2d, Having a conical reflector extending down over the upper portion of the globe, substantially as set forth.

71,445.—WASHING MACHINE.—John Blackwood, Scranton, Pa.

I claim, 1st, The corrugated perforated board, G, resting upon the springs, e e, in the bottom of the box, A, and used in combination with the carriage, D, in the manner and for the purposes specified.

2d, The carriage, D, with rollers, E E, adjustable by means of the journal bearings having pins, x x, and coil springs, when constructed and operating in the manner and for the purposes set forth.

3d, The box, A, having hinged lid, B, when said lid, is provided with the ways, C C, connected by the pins, a a, with coil springs, and used in combination with the carriage, D, provided with its rollers, b b, in the manner and for the purposes described.

71,446.—COMBINED RANGE AND HEATER.—N. A. Boynton, New York City.

I claim, 1st, The deflector, M, in the air box, C, in combination with the air flues, N, substantially as shown.

2d, Also in combination, the air pipes, N, envelopes, E and I, and smoke flues, J, substantially as shown.

71,447.—SNAP FOR GLASS WARE MAKERS.—Owen B. Brigham, Cambridge, assignor to Young, Haines & Dyer, Boston, Mass.

I claim, in combination with the fixed plates, a and f, the clamp plate, k, so constructed and arranged that the base of the goblet is clamped down against the bed plate, substantially as described.

Also in combination with the plate, f, the neck, r, for directly supporting the goblet bowl, substantially as set forth.

71,448.—FURNACES FOR ROASTING ORES.—William Bruckner, Central city, Cal.

I claim, 1st, Making or arranging the interior of the box or cylinder at an angle with or to the axis of revolution, substantially as described, so that as the cylinder or box is turned the contents will, by their own gravity, roll or slide alternately from one end toward the other at each revolution of the cylinder

Also making the journals at the ends of the cylinder diagonally opposite to each of the inclines or interior working surfaces of the cylinder.

3d, In combination with a box or cylinder having its journals arranged diagonally to its interior inclines or working surfaces, as described, making openings in the ends or hollow journals for the blaze and heat to enter the cylinder to roast the ores or for supplying and discharging the ores to be roasted.

71 449.—LAMP.—Henry E. Burton, Boston, Mass., assignor to himself, Samuel N. Ufford, and Hezekiah G. Ufford.

I claim, 1st, The combination of two or more decks, A B, the lower one, B, being perforated so as to admit sufficient air to produce the required combustion, the upper deck, A, ogee-shaped, perforated at the base with two or more lines of holes, acting as a cooler to the chimney and cone, inclining toward the wick-tube, p, and extending to within one-quarter of an inch of the top of same.

2d, The combination, with two or more decks, constructed and arranged as described, of the cone, c, and supports, e.

3d, The cones, A B and C, wick-tube, d, and rods, f f, when combined and arranged as described.

71,450.—PITMAN.—John Butter, Buffalo, N. Y.

I claim, 1st, Constructing the socket in two parts, F and G, the lower one of which is fastened to the cutter bar, for the purpose and substantially as described.

2d, Constructing the spherical end or ball of the connecting rod of two independent hemispheres, B and D, with interposed packing, E, for the purpose and substantially as set forth.

3d, Providing the socket with an opening or slot, 1, for the purpose as herein described.

4th, The spring stop, K, for the purpose and substantially as set forth.

71,451.—PREVENTING INCRUSTATION OF STEAM BOILERS.—S. G. Cabell, Quincy, Ill.

I claim, 1st. The combination with a steam boiler of an electro-magnet, applied externally, and having its core extending within the boiler and insulated therefrom, substantially as described.

2d, In combination with an electro-magnet constructed and applied to a boiler as described, I claim the use of the screws, n, or wires, u, for making or breaking connection with the boiler shell at will, as set forth.

3d, In combination with an electro-magnet applied externally, I claim the use of a permanent magnet applied internally to the boiler, as herein described.

71,452.—CONCEALED HINGE.—George R. Cady and William H. Cooper, New Haven, Conn.

We claim securing the arm, E, to the plate, B, by passing the end, d, through, and so as to bear against the shoulder, a, and so that the projection, e, will rest upon the inclined seat, f, and there secured by means of the screw, h, or its equivalent, substantially as herein set forth.

71,453.—HORSE HAY FORK.—William Carlton (assignor to himself, Daniel A. Loomis, and Adam Wagener), Adrian, Mich.

I claim, 1st, The roller, E, applied to the retaining face of the catch, D, and adapted to operate substantially as described, for the purpose specified.

2k, The combination of the head, A', having a beveled end, a, latch, D D', roller, E, and spring, b4, arranged and operating substansially as described, for the purpose set forth.

71,454.—ADJUSTABLE SCAFFOLD.—P. Cavalier, Plainview, Minn.

I claim the arrangement of the scaffold frame, constructed as specified, with the platform, D, block and tackle, F F, pulleys, J J and K, and pins, E E, substantially as and for the purpose herein set forth.

71,455.—CUTTER HEADS FOR PLANING MACHINES.—Wm. H. Christie, Albany, N. Y., assignor to himself and Wm. H. Burton.

I claim a cutter for forming moldings, when formed of a series of plates, B each having cutting teeth, a a, and an elongated slot in which is the mandrel, and upon it the plate can be adjusted, so as to cut any desired shape of molding, substantially as described.

71,456.—PENCIL HOLDER.—N. B. Cooper, Liberty, Ind.

I claim the construction of the pin, A, as set forth, and used in combination with the rubber band, B, in the manner and for the purposes specified.

71,457.—CLOTHES PIN.—N. B. Cooper, Liberty, Ind.

I claim forming one piece of wire into a clothes pin in such a manner as to leave a circular opening, a, at the top, crossing the ends of the wire below the circle to form the ellipse, b, and again below this ellipse to leave a smaller elliptical space, C, whereby the clothes or line may be held by the spring of the wire, as specified.

71,458.—ELECTRICAL CAR STARTER.—Joseph Clark and Wm. H. Clark, Philadelphia, Pa.

We claim, 1st, The combination of the circuit wheels, C, having different numbers of teeth, with the minute and hour shafts, for giving alarms at different portions of time, arranged and operating substantially upon the principle and in the manner hereinbefore described.

2d, The movable sliding changer, E, having a platinum point, c, in combination with the racks, F and F', for changing the alarm to different portions of time, substantially as specified and shown.

3d, The combination of the hand, H, with the circuit wheels, C, by means of the tube, G, substantially as described, and for the purpose set forth.

4th, The combination of the tube, G, and nut, I, with the circuit wheels, C, and minute shaft, C', for setting the wheels to the starting point, substantially as described.

71,459.—PNEUMATIC BREAST DEVELOPER.—James M. Clark, Lancaster, Pa.

I claim, 1st, The combination of the mold, A, conformed to the shape of the female breast, and adapted to completely enclose the same, while pressing only on the sternum, the nipple recess, G, and a suitable exhausting device, for the purposes set forth.

2d, In combination with the above, I further claim the supplemental cup, C, for the purpose set forth.

71,460.—CANE AND LAMP COMBINED.—Thomas Crossley, Bridgeport, Conn.

I claim a cane, staff, crutch, umbrella handle, or other analogous portable article, constructed in two parts, A and A', and enclosing the oil receptacle, B, and wick tube, C, in one part, and the cap, D, and compressing spring, bearing against the latter, in the other part, said parts being arranged substantially as set forth.

71,461.—WATER WHEEL.—A. H. Crozier, Oswego, N. Y.

I claim the bottom of the curb, having its inner edge, around the scroll-shaped opening therein, curved upward for a portion of the circumference, and curved downward for the remaining portion, substantially as described, and for the purposes set forth.

I claim the openings in the top of the wheel, with valvet opening downward to prevent the water from flowing up, but admitting the air freely downward, to facilitate the escape of the water from the buckets.

71,462.—SPUR.—B. A. Davis, Petersburg, Va.

I claim putting two buttons, a a, on both sides of the bow or frame, A, and attaching the strap, E, to both, and the securing strap, F, to the rear button, so as to form the fulcrum of a lever, substantially as and for the purposes herein set forth.

7 ,463.—TOOL FOR DRILLING METALS.—Edward Davies and Richard Hobbs Taunton, Birmingham, England.

We claim the construction and arrangement of a combination drill brace, in the manner and for the purposes hereinbefore described and represented in the accompanying drawing.

71,464.—Canceled.

71,465.—STOVES AND FURNACES.—J. B. Driscole, New York city.

I claim a close stove or furnace for burning bituminous coal, containing the following combination: a fire pot, b, to contain the bituminous coal, surmounted by a chamber, a, through which the products of combustion pass away upwards from the fire in the usual way, and air-supply passages, C, which supply all the air admitted to the fire to support combustion, at or as near as may be to the surface of the fire, substantially as described.

71,466.—BRICK MACHINE.—Helmuth Dueberg, New York city.

I claim, 1st, The channels, F F', extending in opposite directions from the tapering spout, E, and carrying the compressed clay to the reciprocating table, H, substantially as and for the purpose set forth.

2d, The feeder, K, in combination with the reciprocating table, H, molds, I I', and press-boxes, G G', constructed and operating substantially as and for the purpose set forth.

3d, The rocking lever, M, carrying the followers, L L', and operating in combination with the reciprocating table, H, molds, I I', and press-boxes, G G', substantially as and for the purpose described.

4th, The recesses, h, in the press-boxes, G G', to allow the surplus clay to escape, as set forth.

5th, The pieces of flannel, or other absorbent material, supplied with oil from cups, m, in combination with the reciprocating table, H, molds, I I', and followers, L L', constructed and operating substantially as and for the purpose described.

71,467.—PROCESS OF DISINFECTING ROOMS, SHIPS, AND OTHER STRUCTURES.—Edward Dumpelmann, Washington, D. C.

I claim, 1st. Disinfecting rooms, ships, water-closets, and other apartments by burning a liquid charged with any chloride salt, decomposable at the temperature of a burning flame, as described.

2d, A liquid for disinfection, being combustible, and containing decomposable volatile chlorides, substantially as described.

71,468.—FASTENING FOR BURIAL CASKET.—Edward S. Earley, Philadelphia, Pa.

I claim the concealed fastening herein described, the same consisting of the plate, C, with slot, a b, and the stud, D c d, applied respectively to the under side of the lid, B, and top edges of the body, A, and operating together substantially as specified and shown, and for the purposes and uses hereinset forth.

71,469.—CHURN.—Wm. T. Eastes, Madison county, Ind.

I claim the dash, z, substantially as and for the purpose set forth, in combination with the crank, d, the rod, f, the lever, g, and the jointed arm, k x, all connected substantially as described.

71,470.—ESCAPEMENT FOR ELECTRIC CLOCKS AND DIAL INDICATORS.—Benjamin Franklin Edmands, Boston, and James Hamblet, Jr., Charlestown, Mass.

We claim the construction of an escapement, in which the pallets are resilient, being attached to the end of springs or spring bars, instead of to a rigid bar or anchor piece, so that one pallet will always enter between the teeth on one side of the escape wheel before the other is entirely pushed from between the teeth on the other side of the wheel, and in such manner that the power of the entering pallet renders the action of the pallet first propulsive and then detentive to the escape wheel, substantially as herein described.

The anchor-shaped independent levers, L T T', or their equivalent, to actuate the movement of the pallets, P P', to and fro, and cause them alternately to enter and leave the teeth of the escape wheel, as herein described.

In combination with the resilient pallets and springs, and the bent lever, the binding spring, K, and the stops or guards, V V', substantially as herein described, and for the purpose specified.

71,471.—MACHINE FOR POLISHING INNER SURFACE OF TUBES.—Leonard Egleston (assignor to Rumsey & Co.), Seneca Falls, N. Y.

I claim, 1st, The combination of the shaft, A, sliding cone, E, crossed levers, C C', and polishers, D, substantially as described.

2d, The combination of the lever, G, yoke, F, shaft, A, cone, E, and crossed levers, C C', substantially as and for the purpose set forth.

3d, The combination of the crossed levers, C C', and polishers, D, when the latter are attached to a pivot, so as to permit their longitudinal oscillation, substantially in the manner and for the purpose set forth.

71,472.—CHURN.—Joseph J. Everst, Cumberland, Md., as-

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sign or to himself and G. P. Gephart.

I claim, 1st, The combination and arrangement of the floor, C, provided with valves, c c', and fitting loosel in the churn, so as to leave a space around its edge, with the vertical pieces, i i, and the dasher, D, substantially as and for the purpose specified.

2d, The combination of the floor, C, having valves. c c', with the dasher, D, so that the dasher is free to revolve, but yet is inseparably attached to the floor, substantially as and for the purpose specified.

3d, The combination of the lever, H, slide, B, pitman, P, and wheel, E, when used to operate the dasher of a churn, substantially in the manner and for the purpose specified.

4th, The dasher, D, having the radical arms, e e, arranged on the shaft, d, substantially as and for the purpose shown.

71,473.—APPARATUS FOR PUNCHING SAW TEETH.—James E. Emerson, Trenton, N. J.

I claim, 1st, The combination of a series of punches with a series of dies, each in its own stock, when so made and arranged that it will punch out the throat of a saw tooth, and a hole, or a series of holes, behind or above said throat, and in a line corresponding to the wear of the saw teeth, and at one operation, substantially as described.

2d, Also, the so arranging of the series of punches and the series of dies in their stocks as that they may be set to punch the throats of saw-teeth, and the series of holes behind or above them, in straight, inclined or curved lines as may be desired substantially as described.

3d, Also making the punches of separate pieces of steel, and fitting them to recesses or grooves in their respective plates substantially in the manner described, so that, when set up in the stock, one plate shall hold the punch of the next adjacent plate, throughout the series, substantially as described.

71,474.—DOOR LATCH.—J. B. Evans, Millville, N. J.

I claim the combination and arrangement of the bolt, B, bent lever, D, spring, E, projection, F, bolt and knob, C, and case, A, as and for the purpose specified.

71,475.—VAULT LIGHT.—Fred. Fitzgerald, Cincinnati, Ohio.

I claim a vault light, having a grooved or otherwise uneven upper surface and an under surface composed of a series of rounded parallel ridges, b c c', of unequal depth, with intervening rounded valleys, d d', as and for the purposes set forth.

71,476.—MARINE TELEGRAPH.—Alfred Foucaut, New York city.

I claim 1st, The hinged segment, d, provided with two armatures, ff*, in combination with the index hand, b, and panes, L S, constructed and operating substantially as and for the purpose set forth.

2d, The saddle, i, in combination with the spring, h, hinged segment, D, and index-hand, b, substantially as and for the purpose described.

3d, The spring studs, q* r*, in combination with the segment, d, electro-magnets, g g*, electro magnetic alarm bells. S* L*, constructed and operating substantially as and for the purpose set forth.

4th, The lid, j, and "course" pane, C, in combination with the elector-magnet, n, armature, m, and switch, D*, constructed and operating substantially as and for the purpose described.

5th, The alarm bell, C* in combination with the lid, j, pane, C, electro-magnet, n, and switch, D*, constructed and operating substantially as and for the purpose set forth.

6th, The switch, U, in combination with the rudder-head, R, and electro-magnetic alarm-bells, H H*, in the commander's box, B, substantially as and for the purpose described.

7th, The regulator, W, carrying non-conducting segments of different length, in combination with the switch, U, and rudder-head, R, constructed and operating substantially as and for the purpose described.

71,477.—LUBRICATING ROLLER IN SPINNING MACHINES.—F. C. Fuller, Lowell, Mass.

I claim the central passage. e, and oil holes, c, and n, in the arbor, a, of the shell-rolls, for the purpose and substantially as described.

71,478.—GATE AND DOOR SPRING.—J. C. Gould, Oxford, N.J.

I claim the combination of a spring and link, or its equivalent, with a yoke a b, curved substantially as described and for the purpose specified.

71,479.—ALLOYS FOR MAKING PLATES AND SHEETS.—J. D. Grüneberg, Spring Mills, N. J.

I claim the within described article of metal. made from the metals, and of the proportions, and by the means, and in the manner substantially as specified.

71,480.—LOOM.—Fred. Haigh, Methuen, Mass.

I claim the combination of the shaft, d. and its arms, f g, with the puppet, l, and the slider, k, its studs, h i, spring, n and collar. m, the whole being applied together as and for the purpose or objects specified,

Also, the combination of such mechanism, or its equivalent, with the loom frame and lay, to operate with the shuttle as specified.

Also the combination of the stop-screw, o, and cross-piece, p, with the shaft, d and its arms, f g, the puppet, l, the slider, k, its studs, h i, spring, n, and collar, m, or the equivalents thereof.

71,481.—DETACHABLE OVEN AND DRUM.—C. A. Harper and Isaac A. Crane, Rahway, N. J.

We claim 1st, In combination with the external case, A, and internal oven, D, the flanges, E, located as described, pipe, G, and damper, H, for the purpose of effecting distribution of the heat, substantially as set forth.

2d, In combination with the external casing, A, and oven, D, we claim the door, I, with the lower and upper series of openings at K and K', and the plate, L, so placed as to leave the space, L', at the back of the oven, substantially as and for the purpose set forth.

3d, In combination with the external case, A, oven, D, and pipe, B, we claim the plate, B', arranged to operate substantially as and for the purpose set forth.

71,482.—FORGING CUTLERY.—H. B. Harvey, West Meriden, Conn

I claim, 1st, The combination of the two rolls, C and D, each having a recess or die formed in its face, the one corresponding to the other, and arranged so as to receive and form the blank for cutlery, substantially as herein set forth.

In combination with the above, an automatic feeding device, constructed and arranged substantially as described so as to introduce the blanks to the rolls at the proper time.

71,483.—BRIDGE.—Peter Hendricks, Floris, Iowa.

I claim 1st The combined wire suspension-chain or cable and truss-bridge, constructed substantially in the manner herein described and shown.

2d; The twisted wire stirrups, F, applied substantially in the manner and for the purpose described.

3d, The combination of the wooden trusses, B2 N, braced, stayed, and anchored substantially as shown, with the wire suspension chain or cable, D, wire stirrups, F, and the platform, K, all substantially as described.

71,484.—TRUSS BRIDGE.—G. P. Herthel, Jr., St. Louis, Mo.

I claim 1st, The combination of the last piece, a, of the upper chord, A, with the end bolt. C', the lower chord, C, the queen bolt, D, the compression post, E, and tension-post rod, G, and king-bolt, B, substantially as and for the purposes set forth.

The end bolt, B', in combination with the rollers, b, and the chords, A, and C, substantially as set forth.

3d, The general combination of the upper chord, A, the lower chord, C, post-rods, G', posts, E, and braces, F, substantially as set forth.

71,485.—ENAMEL AND LEATHER.—Sanford A. Hickel, Spencer, W. Va.

I claim the combination of the above materials or ingredients in the proportions named, and the resulting compound: the improved enamel finish, and the application of the same to leather, wood, iron, steel and cloth.

71,486.—APPARATUS FOR KILLING INSECTS.—Henry Hill and Llewellyn E P. Bush, Lexington, Ky.

We claim the heater, A, provided with the flue, B, cylinder, K, and adjustable tubes, g f, as and for the purpose set forth.

71,487.—HOOP SKIRT.—F. Hull, Birmingham, Conn.

I claim the attachment of hoops to vertical tapes by means of the springs inserted so as to pass through the pocket in the vertical tape, while the covering of the wire is upon the outside of the pocket in the vertical tape, substantially as herein set forth.

71,488.—SEED PLANTER.—Samuel C. Hunter, East Hickory, Pa.

I claim the construction of a seed planter, with the dropping boxes, C C, constructed as described, in combination with the lever, E, and the eccentrics, N N S, and the false wheel, B, and the covering plows, P P, when the same are constructed as described, in the aforesaid combination, for the purposes set forth.

71,489.—CHURN.—Patrick Hutchinson, Boston, Mass.

I claim the arrangement and combination of the two bent levers, E E', their connecting rods, F F', single adjustable crank pin, G, and slotted crank, H, together and with the driving shaft, the two churn dashers, D D', and the gallows frame, C, the whole being substantially as specified.

71,490.—WATER HEATER FOR STOVES.—G. L. Ingersoll, Cleveland, O.

I claim a cylindrical boiler or boilers, A, connected to each other by pipes, H, and provided with induction and eduction pipes, I I, when enclosed within a case, F, with or without the extension bottom, C, in combination with the stove, A, for the purpose and in the manner substantially as set forth.

71,491.—KNIFE AND SCISSORS SHARPENER.—J. Nelson Jacobs, Worcester, Mass.

I claim, 1st, The combination of the slots, E and F, the file, B, screw, D, and plate, C, as and for the purpose specified.

2d, In combination with the above, finishing the ends of the blocks of wood by covering the same with flock, emery, or other like fine fibrous or granular substance, for the purpose specified.

71,492.—APPARATUS FOR APPLYING CLASPS TO SKIRTS.—James Jenkinson, Brooklyn, N. Y.

I claim, 1st, The combination, with a supply box or hopper, A, and stationary inclined feed board, C, of the preparatory or intermediate feed board or plate, B, made adjustable as regards the inclination of its surface, substantially as specified.

2d, The turnover plate, J, in combination with the guide bar, I, for operation essentially as and for the purposes herein set forth.

3d, The arrangement of the slot, e, in the inclined feed board or plate, C, with relation to the divider, K, for action together, as herein set forth.

4th, The divider, K, hinged at its outward end, so as to be capable of being raised for the passage of the dirt or clearance of an imperfect spangle without removing the gate, substantially as specified.

71,493.—CORN PLANTER.—Joseph John, Massillon, O.

I claim, 1st, The arrangement of the shafts, E and F, clutch, T, wheels, G and H, shaft, I, wheel, L, and spout, M, in the manner and for the purpose set forth.

2d, The arrangement of the cam block, Q, with the bar, P, roller, O, and spring, a, as and for the purpose set forth.

71,494.—MANUFACTURE OF SALT.—Clarkson F. Johnson, East Saginaw, Mich.

I claim, 1st, constructing a narrow pan or trough, A, or its equivalent, for carrying the brine in the most heated route from the boiling box, B, in front, back through the smoke stack, C, and emptying it into the rear end of the unsettled or lower body of brine, D.

2d, Making large openings, E, in the front end of the crystalizing pan, F, and on either side of the boiling box, B, to prevent the pressure upward and leakage of the unsettled or lower body of brine on the crystallizing pan, F.

3d, Constructing a vat bottom in the way and manner set forth in the drawings.

71,495.—SHAPING THE SOLES OF BOOTS AND SHOES.—Joseph B. Johnson, Lynn, Mass.

I claim the combination of the mold, the press, the last, and the elastic bottoming of the latter.

Also, the combination of the presser with the press, the mold, and the last and its elastic bottoming, as set forth.

71,496.—TUBE WELL.—J. Dwight Kellogg, Jr., Northampton, Mass.

I claim the removable slotted interior tube, C, having the bail, r, and flanges, e e', adapted to contain the enclosed filtering substance, i i, when used in combination with the well tube, A, substantially in the manner and for the purposes specified.

71,497.—MACHINE FOR ROUNDING UP SOLES.—Wm. H. N. Kimball, Lynn, Mass.

I claim for use with a pattern and a knife and a feeding mechanism, such an arrangement of a gage for the pattern to bear against that the chip cut will pass beneath the gage, so as not to obstruct the view of the operator, thus enabling him to keep the pattern always in contact with the gage, substantially as described.

71,498.—BENCH VISE.—Charles L. Kingsley (assignor to Charles Parker), Meriden, Conn.

I claim the plate, D, constructed with the channels as described, and arranged upon the projection, C, on the jaw, B, so as to be adjusted thereon in the manner specified.

71,499.—PROCESS OF CLEANING COTTON SEED.—John Kirkman, Peoria, Ill.

I claim the process of cleansing cotton seed by the action of sulphuric or other acid, either separately or combined, substantially as and for the purpose above described.

71,500.—DEVICE FOR CLEANING STOVE PIPE.—Warren J. Nace (assignor to himself and George L. Hafer), Tippecanoe City, Ohio.

I claim the provision in a stove pipe of the crank rod, D, loaded disk, F, ball, I K, and chains, J and L, the whole being arranged and adapted to operate as set forth.

71,501.—FURNACE FOR STEAM BOILERS.—John F. Myers, Noah Leas and Worley Leas, Kokomo, Ind.

We claim, 1st, the combination of the vertically sliding damper, D, chamber, G, and doors, G', for the regulation of the draughts, said parts being arranged substantially as set forth.

2d, The combination of the vertically sliding damper, D, with the pipes, D2, having valves, D1, when arranged to control the course of the draught, substantially as set forth.

71,502.—ATTACHING KNOBS TO THE SPINDLES OF DOORLOCKS. Wallace T. Munger (assignor to Thomas Kennedy), Branford, Conn.

I claim the combination of the collar, d, with the neck, F, of the knob, provided each with corresponding shoulders, arranged and combined with the plate, G, so as to operate to secure the knob, substantially in the manner as herein set forth.

71,503.—GATE.—Theodore Munger, Jaynesville, Iowa.

I claim the adjustable pieces, e e' e", in combination with the gate, G, substantially as and for the purpose shown.

71,504.—BED BOTTOM.—Leander Mudge, Springfield, Ohio.

I claim a bed bottom, constructed with a small cord, G, traversing the space between the side rails, passing around pulleys, B, attached to the latter at close intervals, and connected at one end to the bedstead, or to a spring, C, and at the other to a tightening axle, D, substantially as described.

71,505.—MAGIC WATCHCASE.—Edward A. Muckle, Philadelphia, Pa.

I claim, 1st, The inside case, E, rotated by the pendant, F, substantially as described.

2d, The pendant, F, journalled in the center, B, and having secured to it the rotating inside case, E, substantially as and for the purpose described.

3d, The pusher, G, protruding at the side of the pendant, F, above its end, substantially as described for the purpose specified.

71,506.—APPARATUS FOR CONVERTING ROTARY INTO RECIPROCATING MOTION.—Duncan Morrison, Portland, Me.

I claim the arrangement of the several devices hereinbefore described, to wit, the swinging arm, a b, shaft, c, gear, d, shaft, f, wheel, h, gear, e, connecting rod, i, saw frame, k, lever, p, bed, r, in and upon the frame, A, to constitute a convenient means of working a wood saw, substantially as specified.

71,507.—PLOW.—Gilpin Moore, Moline, Ill.

I claim, 1st, A movable wedge bolt, arranged to operate as described, for adjusting the beam of a plow laterally, substantially as set forth.

2d, A cast standard, having a slot or recess formed therein to receive the movable wedge bolt, and used in combination therewith for adjusting the beam of a plow, substantially as described.

71,508.—METHOD OF MANUFACTURING TUBULAR BODIES.—James Montgomery, Croton, N. Y.

I claim the construction of hollow. wrought-metal bodies, by combining with segmental or main bars, a, intermediate double-headed bars, b, and afterwards welding the same together, substantially as specified.

71,509.—AWNING.—S. Miller and J. S. McClellan, Champaign County, Ohio.

We claim the combination of extension arms, G, spiral spring, H, canvas, A, boards, K, and cord, l, the whole constructed and operating as described, and for the purposes set forth.

71,510.—VALVE FOR WATER CLOSET.—Charles H. Miller, Buffalo, N. Y., assignor to Charles H. Harrison, New York city.

I claim, 1st, The adjustable piston, D, in combination with the valve, C, and cylinder, B, substantially as described.

2d, The removable cylinder, B, arranged in the body of the faucet, and forming a water chamber above the piston, for the purpose and substantially as described.

71,511.—FOLDING OR LUNCH BOX.—George B. Mershon, Philadelphia, Pa.

I claim the arrangement of the sides, A B C D, and ends, E and F, and hinges attached to the sides, D, E and F, completed by the pins, I I, when the box is in form for use, and the parts, K K, for the purpose of closing the box, in connection with the pins, I I, and the hinging at the ends of the side, D, when folded.

71,512.—MACHINE FOR TAPPING BOLTS.—E. M. Mayo, Cincinnati, Ohio.

I claim the die-holding levers, C, pivoted to the head, B, secured to the end of a hollow mandrel, A, connected by the links, D, to the sliding collar, E, and the lever, G, all arranged to operate as shown and described.

71,513.—PLOW.—Elbridge G. Matthews, South Natick, assignor to Frank F. Holbrook, Boston, Mass.

I claim, 1st, The arrangement of the arm, A, its flanges and shelf, c, or their equivalents, with the plow standards, S, and its base, a, as described.

Also, the arrangement of the tooth, t, and the buttress, g, with the plow-standard and its shoes, as set forth.

Also, the plow-standard as made with an arm to extend back and up from its base, so as to give support to the two handles and beam, substantially as set forth.

71,514.—PORTABLE GAS APPARATUS AND CARBURETER.—John MacDougall, New York city.

I claim, 1st, The air tube, o-p, arranged around the shaft, e, at the place where it passes through the end of the rotating vessel, substantially as described.

2d, Arranging the mouth of the branch, p, of the air pipe, o-p, in such a manner that it opens downward over the surface of the oil, substantially as described.

3d, The floating hinged valve, q, arranged substantially as described, under the mouth of the air pipe, o-p.

4th, The escape pipe, r, for the discharge or escape of condensed matters from the pipe, o-p, substantially as described.

5th, The application of a valve or cover to the outer end of air pipe, o, to close it when the apparatus is not in operation, so as to prevent the escape of vapor, substantially as specified.

6th, Enclosing the geared end of shaft, e, within a jacket, and setting the shaft of the gear that drives said shaft in the upper part of the jacket, so as to prevent the oil from leaking at the end of shaft, e, substantially as shown.

7th, The inclined double bottoms, 6, in the oil containing vessels, h j, or either of them, substantially as and for the purpose described.

8th, The U-shaped pipe, n, leading from the supply tank, j, and terminating in the outer apartment, m, substantially as described.

9th, The air conducting tube, l, leading from the air space of tank, j, and terminating in the outer apartment, z, when its lower end is cut off at an angle, substantially as and for the purpose described.

10th, The arrangement of the inverted conical valve, x, in the pipe, t, in such a manner that its base closes the valve opening of said pipe, and its narrow end operates to guide the valve, and keep it straight in its movements, substantially as shown.

11th, The connection of the top of the receiving veesel, t, with the valve, x, by means of a rigid arm, y, whereby the valve is moved back and forth by positive force, substantially as set forth.

71,515.—LAMP FOR KINDLING FIRES.—Shederick J. Lowe, Quincy, Ill,

I claim, 1st, A lamp provided with a traversing adjustable wick tube, that may be moved or slid in and out when required.

2d, Making the traversing adjustable wick tube of a lamp curved, substantially as described for the purposes set forth.

3d, In combination with the oil vessel I claim the case, C, for holding and guiding the wick tube, substantially as described.

4th, In combination with the traversing wick tube, I claim the hinged slotted plate, c, and ring, K, for holding the wick tube, as described.

5th, I claim in combination with the oil vessel, the shield or guard plate, Q, arranged in front to keep the heat of the fire kindled from heating the oil vessel.

6th, I claim the partition in the oil vessel to hold the oil back when the lamp is tipped, and prevent it from running to the wick so freely as it would do if there were no partition.

71,516.—FELTING MACHINE.—Wm. Lodge and Hiram Platner, Danbury, Conn.

We claim, 1st, The combination of the boards, D and E, one or both having a reciprocating motion, as described, with an apron or pocket, G, for holding the goods to be felted, arranged and operating substantially as specified.

2d, The combination with the felting boards, D and E, and apron, G, of the take-up or adjusting roller, d, to the latter, substantially as specified.

3d, In combination with the felting boards and aprons, G, the treadles, h, for effecting the delivery of the goods from the bath, essentially as described.

71,517.—HOT AIR FURNACE.—Robt. Z. Liddle, Brooklyn, N.Y.

I claim, 1st, The combination with the main body of a furnace constructed substantially as described, of a single or double feeder, substantially as and for the purpose set forth.

2d, Extending the conducting pipes or channels, I I I, or their equivalents, for supplying the double feeder with air through the walls or casing which incloses the furnace and into the cold air space beyond said wall or casing, so as to supply said feeder with cold air, substantially as hereinabove set forth.

3d, The combination in an air heating furnace containing a single or double feeder, of the annular flue or ring, E, with short pipes or connections, C, connecting the smoke chamber, with said ring, said short pipes or connections and ring being surrounded by air passages, substantially as described.

4th, The combination in an air heating furnace containing a single or double feeder, of the sliding damper, N, with the annular flue or ring, E, and short pipes or connections, C, substantially as described.

5th, Closing or reducing the size of the openings through one or more of the short pipes or connections, C, in an air heating furnace containing a single or double feeder to equalize the draft from the combustion chamber, and to shut off direct communication from the combustion chamber to the exit pipe, substantially as described.

71,518.—DRY GAS METERS.—Charles C. Lloyd, Philadelphia, Pa., assignor to the American Meter Company, New York, Philadelphia, and Boston.

I claim, 1st, Making the flagstaff, C, and its horizontal arm, c', in one piece, by bending it as described and set forth, for the purpose specified.

2d, Connecting the flag, D, to the bellows disk, E, by means of a hinge joint consisting of the vertical stem, f', and the brackets, f" and f"', when the said parts, f' f" f"', are constructed and connected together in the manner described and shown, for the purpose specified.

3d, Also maintaining the requisite parallelism between the bellows disk, E, and the partition, a', during the motions of the former, by means of the coupling arrangement. G G' G", combined therewith substantially as and for the purpose described.

71,519.—CLOCK.—William Lindon, New Haven, Conn.

I claim the arrangement of the cam, S, combined with the bar, H, and the hammer, I, so as to operate in the manner substantially as set forth.

71,520.—MEANS FOR MEASURING AND LAYING OUT GARMENTS.—Jacob Lemley, Jr. (assignor to himself, I. W. Yeakell, and C. O Kline), Newtown, Va.

I claim the combination of the formers on which are indicated a single table of measurements, with a series of graduated scales, said scales being entirely independent of each other and of the former, but so arranged as to be susceptible of being readily attached to and detached from the former. substantially as described.

71,521.—NAIL-PLATE FEEDER.—E. B. Lake, Bridgeport, N. J.

I claim, 1st, The barrel, C, constructed substantially as described, in combination with the devices herein described, or their equivalents, for imparting to the said barrel a combined rotary, longitudinal, and vibratory motion, for the purpose specified.

2d, The above in combination with the vibrating plate, B, swinging frames, b and f, and rings, c and e, for vibrating the barrel, C, as described.

3d, The casing, F, substantially as described, turning in the hinges, j and j', and arranged on plate, D, to slide on the vibrating plate, B, in the manner and for the purpose specified.

4th, The casing, F, combined and operating in conjunction with barrel, C as specified.

5th, The box, G, adapted to an opening in the casing, F, when arranged to slide in the same, substantially in the manner described.

6th, The above in combination with the spring, n, and its flap, n', for holding and guiding the plates, x.

7th, The combination of the pulleys, p and p', the band, q, its projections, q', and the spring, w, the whole being constructed, arranged, and operated substantially as described, for propelling, holding, and guiding the nail plate.

8th, The rollers, v v' and the springs, y y1 and y2, within the passage, z, combined and arranged as and for the purpose specified.

9th, The lugs, u, of the spindle, r', combined with the adjustable sleeve, t, and spring, t'.

71,522.—HORSE POWER.—J. A. Leibey, Davenport, Iowa.

I claim constructing horse-powers with a single driving shaft, i, extending under the master-wheel, out at each side, and provided with a coupling at its opposite ends, substantially as and for the purpose set forth.

71,523.—FAGGOT FOR RAILROAD RAIL.—Wm. Leighton, Wyandotte, Mich.

I claim the V-shaped socket, A, and the V-shaped block, C, on the pile of flats, B, substantially as and for the purposes specified.

71,524.—STOVEPIPE DAMPER—Harrison Ogborn, Richmond, Ind.

I claim 1st, The plate, F, provided with end pieces, f, sliding in the slot, c', and d2, substantially as described.

2d, The slots, c', in the cross-plates, C', substantially as and for the purposes described.

3d, The slots, d2, in the parts. d1, of the bearings, D D', substantially as and for the purposes described.

4th, The combination of the plate, F, provided with end pieces, f, the cross plates, C', provided with slots, c', and bearings, D D', the parts, d1, of which have slots, d2, substantially as and for the purposes described.

5th, The combination of the cone-shaped plates, B and B2, circular plate, B1, provided with an opening, b, sliding plate, F, with end pieces, f, cross-plates, c c', the latter provided with slots, c', and bearings, D D', with grooves c, and consisting of parts, d d1, the latter having slots, d2, substantially as and for the purposes described.

71,525.—COMBINED CULTIVATOR AND POTATO DIGGER.—J.D. C. Outwater, Newark, N. J.

I claim 1st, Casting the shoe with a slotted cylinder, or its equivalent, on its under surface, substantially as described and for the purposes set forth.

2d, The cylinder, cast on the under surface of the shoe, in combination with the tines, K K, and rod, c, when the same are constructed, arranged, and operated substantially as described.

3d, Operating the tines, K K, by means of a shaft, G, having pins, d d, said pins being constructed with or without slotted or bevelled heads, when the same are arranged substantially as described.

4th, The shaft, F, constructed with pins, d d, when said pins are so arranged as to work between the tines, K K, substantially as described and for the purpose set forth,

5th, The main shaft, E, having one or more ground or driving-wheels attached, one of said wheels being furnished with cogs, substantially as described and for the purpose set forth.

6th, Constructing a potato-digger with land sides, C C, substantially as described, and for the purpose set forth,

7th, The brace-rod or cutter, P, when the same is arranged substantially as described, and for the purposes set forth.

8th, The diagonal brace-rod, S, when the same is constructed and arranged substantially as described, and for the purposes set forth.

9th, The slotted brace-bar, D, arranged between the land sides, C C, when the same is constructed and arranged substantially as described.

10th, Securing the beam above the land sides, C C, by means of the braces, M M, when the same are combined and arranged substantially as described.

11th, Securing the cultivator-shares, h h, to the land-sides, C C, when the same are constructed and arranged substantially as described and for the purpose set forth.

71,526.—WASHING COMPOUND.—H. A. S. Park, and J. H. Van Pelt, Cumberland, Md.

We claim, 1st, A "detergent compound," of which the hyposulphite or hyposulphate of soda is an ingredient.

2d, The combination of the hyposulphite or hyposulphate of soda with the bicarbonate of soda in equal quantities so as to form a detergent compound substantially as and for the purpose specified.

71,527.—ANTI-FRICTION JOURNALS FOR CAR WHEELS, ETC.—Charles H. Parshall, Detroit, Mich.

I claim, in combination with the pedestals and axle of a railroad car, two anti-friction bearings, constructed substantially as set forth, and also a tight and a loose wheel the latter turning upon a similar bearing, substantially as and for the purpose set forth.

71,528.—GRAIN DRILL.—Charles E. Patric and Lyman Bickford, Macedon, N. Y.

We claim, 1st, The distributors provided with the enlarged seed runs or passages having the contracted throat or gage formed therein, for the purpose set forth.

2d, The concave depression or sink formed in the distributor shell above the discharge outlet or opening, for the purpose set forth.

3d, The upper flanges of the distributor shell or casings formed or cast with the slots or notches, p, substantially as and for the purpose set forth.

4th, The manner of forming the axis or bearings of the distributor wheel by means of annular flanges or grooves formed in the adjacent faces of the casings and wheel, substantially as described.

5th, The vertical distributors provided with a double feed and operated by means of a square shaft, or its equivalent, in combination with a slide hopper bottom for adjusting or regulating the feed, as set forth.

6th, The "wind guard," P, in combination with the vertical distributors, applied and operating substantially as described.

7th, The lifting bar, L, secured in the described relation to and in combination with the angle irons. M, substantially as and for the purpose set forth.

8th, The angle irons, M, to which the lifting bar is attached provided with the horizonsal flanges or stops, m2, substantially as and for the purpose set forth.

9th, The combination of lifting bar, L, angle irons, M, and lifting lever, N arranged and operating as described with the drill tubes, in the manner and for the purpose set forth.

10th, The employment of the short stationary axles, C, attached to the outer frame bars and to the short inner ties or bars. A2, in the manner and for the purpose set forth.

71,529.—APPARATUS FOR SPONGING CLOTH.—John R. Paul, Philadelphia, Pa.

I claim the adjustable perforated horizontal cylinders, D E, constructed, arranged and operating as above described.

71,530.—ICE RACK FOR REFRIGERATORS.—Henry Pennie, New York city.

I claim the use of the cross cleats, B, for the purpose specified, in a corrugated metallic ice rack, substantially as described.

71,531.—MOLDING MACHINE.—O. H. Perry, Cincinnati, O.

I claim the cutter head, C', adjustable guides, L and K, slotted table, A', and saw, M, when arranged in relation to each other, and operating substantially as and for the purpose described.

71,532.—CIGAR MACHINE.—John Prentice and William F. Wuterich, New York city, assignors to John Prentice.

We claim, 1st, The shaft, o, with the cranks, 4, and links, 5, to the boxes, 2, of the shaft, n, for drawing back the roller, m, as set forth.

2d, The roller, p, mounted on arms, p', from the shaft, o, in combination with the rollers, d e and m, as and for the purposes set forth.

2d, The rollers, m, in combination with a mold for forming the tip, substantially as specified.

4th, The arrangement of the gears, s t and r, in combination with the worm, q, shaft, t', and ratchet wheel, s', as set forth.

5th, The ratchet wheel, s', and its pawl 8, constructed as set forth, in combination with the gearing, s t and r, and rollers, d e and p, as set forth.

6th, The moving section, 1 1, and tip mold or die fitted and operating substantially as and for the purposes set forth.

71,533.—CIDER PRESS.—Enoch Primm, Petersburgh, Ill.

I claim the combination of pulley wheels, C and D G and H, arranged as set forth in combination with sliding frame, A, fixed frame, B, gear wheels, F and O, drum, K, crank, l, spring, N, spring catch, P, and ropes, E I, all arranged in manner and for the purposes substantially as described.

71,534.—DOOR LOCK.—Reinhard Schade, New York city.

I claim the combination of the tumblers, D, each provided with three slots, d e i, and passage way, g h, double bit key, C, bolt, B a, lug, c, and springs, E, or equivalents thereof, the whole arranged and operating substantially as and for the purpose herein specified.

71,535.—LOOSE PULLEY BOX.—C. Purdy, Bedford, Ohio.

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I claim the cylinder, B, provided with annular grooves, h h, and openings, e e, which lead into the chamber, 1, constructed as described, and having wicking, a a, the whole constructed and operating in the manner and for the purposes described.

71,536.—PURIFYING BONE BLACK.—T. H. Quick, N. Y. city.

I claim, 1st, The flue, B, provided with separate shelves or spouts, c, arranged spirally round the interior thereof for operation in connection with a suitable feed or distributor, and escape or dust pipe, substantially as specified.

2d, The combination of the cap, D, having channel ways, b, with the shelves, c, of the flue, B, arranged relatively to each other for operation together, as herein set forth.

71,537.—BURGLAR ALARM.—Tobias Royer, Lancaster, Pa.

I claim, 1st, The arrangement and combination of the hook lever, J, cross lever, R, and notched stop wheel, I, in the manner and for the purpose specified.

2d, In combination with the levers, J R, I also claim the short levers or arms, 1', 2', 3', 4', etc., connected with the covering plates, I, II, III, IV, etc., together with the combined cords or wires, 1' r 2' r 3' r 4' r, etc., arranged in the manner and for the purpose set forth.

3d, Also, the combined segment rubber, L, with its attached pulley, K, provided with an arm, W, and weighted strap, k k', in combination with the spring jaw match holder, N n Q, and bent wire, P, arranged in the manner and for the purpose described.

4th, Also, the combined arrangement of the hook lever, J, notched wheel, I, double ratchet wheels, G F, with its spring pawl, hammer, and bell connection, all arranged and operated substantially in the manner and for the purpose specified.

73,538.—LAMP CHIMNEY FASTENING.—Edwin Russell, Naugatuck, Conn.

I claim, 1st, The annular groove, a, formed upon or attached to the base of the chimney, substantially as described.

2d, The rotating hook, s, constructed and arranged to operate so as to secure the chimney to the lamp top, substantially as described.

71,539.—HUSKING MACHINE.—Jacob Russell, Brooklyn, assignor to himself and Samuel Moffatt, Albany, N, Y.

I claim, 1st, The hollow metallic roller frame, m, formed with a gear wheel, c', and recessed for the reception of the filling, substantially as and for the purpose specified.

2d, The elastic filling, r, in combination with the roller frame, substantially as and for the purpose specified.

3d, The scraper or scrapers, A', arranged above and in relation to a pair or pairs of husking rolls, B, constructed substantially as and for the purpose specified.

4th, The combination of the guide, c, having spurs or extensions, cx, with the husking rolls, B, substantially as and for the purpose specified.

5th, The elastic ejecting roll, C*, arranged transversely above and in combination with the husking rolls, B, substantially as and for the purpose specified.

71,540.—CORN AND SEED PLANTER.—Martin M. Rutt and Adam B. Baer, East Hempfield, Pa.

We claim, 1st, The arrangement of an oscillating disk, C, with its exserted ears and arms, a, operating in a hopper provided with several compartments, in the manner and for the purpose specified.

2d, In combination with the disk, C, and its arm, a, the connecting rod, L, with the arm or rod, M, actuated by the grooved cam, H, all arranged and operating substantially in the manner specified, the use of the spouts, K, and appliances shown and specified.

71,541.—TEMPLES FOR LOOMS.—Edgar F. Shaw, Boston, Mass.

I claim, 1st, A temple, consisting of two tapering rolls, arranged relatively to each other and to the web, substantially as herein shown and described.

2d, The combination of the taper rolls, D D, with the bar or beam of the temple, constructed in two parts, for support and adjustment of the rolls, or one of them, relatively to the other, essentially as specified.

3d, The combination of the taper rolls, D D, arms or brackets, C C', temple beam, made up of a stationary part, A, and movable portion, B, hinged as at a, and made capable of adjustment or separation, as a loose jaw, by means of a screw, E, or its equivalent, substantially as and for the purposes set forth.

71,542.—VALVE FOR STEAM ENGINE.—Jacob Shoemaker, Oakland, Pa.

I claim the arrangement of the induction pipe, B, and the eduction pipe, F, with reference to the valve seat, C, valve, D, and ports, E, when constructed substantially in the manner set forth.

71,543.—ANIMAL TRAP.—T. Silliman, Three Rivers, Mich.

I claim, 1st, The combination with the revolving table of the ball lever, the holding spring, D, and the friction roller, F, when all these parts are constructed and arranged as described for joint operation.

2d, The combination of the table, the bait lever, and the holding spring with the balanced stop lever, C, constructed, arranged, and operating as described.

3d, The combination of the revolving table, the bait lever, the holding spring, and the balanced stop lever, with the box, A, the passage, G, the swinging door, h, the cage, H, and the tipping floor, K, when all these parts are constructed and arranged as described for joint operation.

71,544.—MACHINE FOR CUTTING AND GRINDING ANIMAL MATTER.—Amor Smith, Cincinnati, Ohio.

I claim, 1st, The combination of two metallic rollers with interlocking ribs, square upon their edges, arranged for use substantially in the manner and for the purpose set forth.

2d, The mode of feeding the animal matter to the shearing ribs by means of notches, B2, on the periphery of the ribs, substantially as set forth.

71,545.—CUTTING MACHINE FOR REDUCING CRACKLINGS, etc.—Amor Smith, Cincinnati, Ohio.

I claim the combination of the wheel, A, with cutters, C, box, B, and compressing head, F, substantially as and for the purpose set forth.

71,546.—BALL CASTER.—T. S. Smith, New Haven, Conn.

I claim the seat, A, constructed with a recess, B, so as to form an angular recess, said recess forming a single bearing point on the top, and two driving points, a, near the top of the ball, as set forth.

71,547.—STEAM CUT-OFF VALVE.—William M. Stevenson, Sharon, Pa.

I claim the arrangement of the valve boxes, A and B, boxes, C C, and the eccentrics, m and s, with their rods, t and h, the whole constructed and operating as herein specified.

71,548.—TOBACCO PIPE.—J. B. Stockton, Edmonton, Ky.

I claim a smoking pipe, constructed, arranged, and operated in the manner as shown and described and for the purpose set forth.

71,549.—MEDICINE.—Harriet E. Taylor, Saratoga Springs, N. Y., Executrix of the estate of T. H. Taylor deceased.

I claim the pills composed of the ingredients herein set forth, in about the proportions specified.

71,550.—MUSIC STAFF.—Virgil C. Taylor, Des Moines, Iowa.

I claim the method of indicating the key note in music, substantially as set forth.

71,551.—CORN SHELLER.—Simeon Terry, Boscawen, N. H.

I claim in combination with box, A as constructed, the adjustable apron-block, B, by the screws, E E, the apron, B', with its metal staves, a', secured upon the raised point, c, arranged and operating with the cylinder, C, in the manner and for the purposes set forth.

71,552.—DUMPING CAR.—Edward Thompson, Hokah, Minn.

I claim, 1st, The method of unloading cars, substantially as described.

2d, The use of a scraper, substantially such as described, when arranged to operate in connection with railway cars, for the purpose of removing therefrom the gravel, earth, sand, or similar material with which they may be loaded, substantially as herein set forth.

71,553.—APPARATUS FOR CONSTRUCTING RAILROADS.—Edward Thompson, Hokah, Minn,

I claim, 1st, Operating the scrapers by means of lines and blocks, substantially as described, for the purpose of moving earth, gravel, and similar material, as set forth.

2d, The platform constructed and arranged to operate in connection with scrapers, as and for the purposes set forth.

71,554.—CLAMP STRAP FOR SCHOOL BOOKS.—Louis F. Van De Wiele, Brooklyn, N, Y.

I claim the adjustable angular plates, B, in combination with the strap, A, substantially as and for the purpose specified.

71,555.—FEATHER RENOVATOR.—Uriah B. Waddle, Cleveland, Ohio.

I claim, 1st, The drying pipes, I, arranged with a stationary cylinder or case, A, in combination with the arms, D, and shaft, C, when operated in the manner as and for the purpose set forth.

2d, The steam pipes, K L, conductor, P, provided with a screen, Q, as arranged in combination with the case, A, for the purpose and in the manner as set forth.

71,556.—WASHING MACHINE.—Moses P. Walton, Marlboro, O.

I claim the shaft, I, with crank, H, and fly wheel, J, and the connecting rod, F, when used in connection with the crank, D, on shaft, C, of beater, G, substantially in the manner and for the purpose herein specified.

71,557.—SEEDING MACHINE.—S. B. Ward, Auburn, Ind.

I claim, 1st, The combination of the seed slide, K, with roller, L, and the wheel, A, the latter being constructed with spurs to perform the double function of actuating the seeding mechanism and marking hills, substantially as set forth.

2d, The combination of the wheel, A, with spurs, A', and scrapers, C, arranged as set forth.

3d, The combination of the seeding mechanism and the adjustable plows, harrows and covering flanges, substantially as set forth.

4th, The combination and arrangement of the harrows, G''', straps, G'', and hinged standards, F, and lever, F'', arranged to operate substantially as set forth.

71,558.—RAILWAY CAR APRON OR DUSTER AND BRIDGE.—William H. Ward, Auburn, N. Y.

I claim, 1st, The adjustable apron or duster, when constructed and arranged as and for the purposes herein set forth.

2d, The combination of said duster, or apron, with the bridge or crossing, B, in the manner and for the purpose herein described.

71,559.—CAR COUPLING.—W. Y. Warner, Wilmington, Del.

I claim the link, F, balanced or nearly balanced by the chain, B, or its equivalent, and arranged to slide on the coupling bolt, E, all substantially as set forth.

71,560.—PLOW.—George Watt, Richmond, Va.

I claim, 1st, A plow frame or casting, A, having a neck or breast, a, constructed substantially as herein described, and serving to prevent the accumulation of trash, etc., between the cutting edge and the beam.

2d, The brace rod, J, reflexed at both ends, as described and employed, in conjunction with the staples, j' b1, and key, b2, to connect the frame, A, and mold board, B, substantially as set forth.

3d, The combination with the slide or land side bar, D, of the hook-shaped projection, d, staple, d1, key, d2, and notches, a5, for adjustably securing said slide to the frame, A, as set forth.

4th, The combination, with the frame or casting, A, of the handles, G G, when attached by the bolts, g g', substantially as described.

5th, The removable extension piece, F, applied substantially as and for the purpose set forth.

71,561.—VELOCIPEDE.—Charles A. Way, Charlestown, N. H.

I claim, 1st, The arrangement of the cranks, d, and short axles, c, with reference to each other and with the seat, e, side rails, b, and supporting wheels, B, substantially as and for the purpose specified.

2d, The cords, s, crossing each other, and arranged to operate the guiding caster, g, substantially as and for the purpose specified.

3d, The center rails, a, arranged with their forward portions lower than the corresponding parts of the side rails, b, substantially as and for the purpose specified.

4th, The arrangement of the braces, f, in relation with the side rails, b, and center rail, a, substantially as and for the purpose specified.

71,562.—VELOCIPEDE.—Charles A. Way, Charlestown, N. H.

I claim, 1st, The two driving wheels, furnished with the crank wrists or handles, arranged in relation with the main frame and seat, substantially as and for the purpose specified.

2d, The lever, r, bar, m, and cords, f, arranged in relation with each other and with the arms, e, of the arbor of the caster wheel, substantially as and for the purpose specified.

71,563.—SPRING SEAT FOR CARRIAGE.—John Werntz, Bourbon, Ind.

I claim, 1st, The springs, B C, in combination with the blocks, D, cross bars, E E, and bolt, e, as and for the purpose explained.

2d, The springs, B C, blocks, D, cross bars, E E, and bolt, e, in combination with seat, A, and sockets, a, in the manner and for the purpose described.

3d, The springs, C, with piece, c, in combination with cross piece, F, with socket, f, step, F', and bar, F'', substantially as described.

4th, The springs, B C, blocks, D, cross bars, E E, bolt, e, seat, A, sockets, a, cross pieces, F F, and hooks, G, when combined and arranged substantially as set forth.

71,564.—TELEGRAPH INSULATOR.—Merritt L. Wood, Ithaca, N. Y., assignor to himself, Samuel Porter, and L. M. Monroe.

I claim, in combination with the conical-shaped iron insulator, A, the wedge H, inserted in the top of the standard or support, in the manner and for the purpose as set forth.

Also, the groove, N, around the standard, F, for holding paraffine or other suitable material, for the purpose set forth.

71,565.—TEA POT.—Douglas B. Woodworth, Cincinnati, O.

I claim a fusible metal pot body, A, having the shallow pit or depression, B, and an annular foot, D, of non-fusible metal, brazed or soldered within the receding angle, C, of the pit, at or near the plane of the latter, and wholly external to said body, as and for the purpose set forth.

REISSUES.

2,805.—COMPOSITION FOR INKING ROLLERS, PADS, AND OTHER PRINTING PURPOSES.—Lewis Francis, and Cyrus H. Loutrel (assignees of Lewis Francis and Frederick W. Letmate), New York city.

We claim a composition, made substantially as described, for printing purposes.

2,806.—WATER BOILER.—Charles A. Harper, Rahway, N. J.

I claim, in combination with a boiler, A, an annular water chamber, C, connected therewith by pipes, D D', and so constructed and arranged that the heat shall be applied entirely around the latter, and the water circulate through the same, substantially in the manner set forth.

3,807.—BOOT AND SHOE.—Gilbert Hawkes, Lynn, Mass.

I claim, 1st, An inner sole, made of a textile material, to be used either with or without a stiffening substance, as set forth.

2d, A strip, B, of a textile or other suitable material, or its equivalent, when used as and for the purpose described.

3d, The combination of an inner sole, A, formed of a textile material, with a strap, B, of any suitable material, as and for the purpose specified.

4th, The application to the lasting of boots and shoes, of an inner sole, of textile material, as described.

5th, The mode, substantially as set forth, of securing the uppers to the inner sole, in lasting boots or shoes, by stitching the former, not directly to the latter, but to a suitable supplementary material attached thereto.

DESIGNS.

2,837.—COOK STOVE.—John B. Crowley (assignor to Chamberlain & Company), Cincinnati, Ohio.

2,838.—DOOR KNOB.—Jacob Euteneur, Peoria, Ill.

2,839.—STOVE PLATE.—Henry S. Hubbell, and Alfred S. Hubbell, Buffalo, N. Y.

2,840.—JAR.—S. B. Rowley, Philadelphia, Pa.

2,841.—MUFF.—R. M. Seldis, New York city.

2,842.—TRADE MARK.—D. O'Sullivan, Leicester, Mass.

2,843.—SKATE RUNNER.—H. P. Tilden, Philadelphia, Pa.

PENDING APPLICATIONS FOR REISSUES.

Application has been made to the Commissioner of Patents for the Reissue of the following Patents, with new claims as subjoined. Parties who desire to oppose the grant of any of these reissues should immediately address MUNN & Co., *37 Park Row, N. Y.*

66,861.—LAND ROLLER AND MARKER.—A. Mains, Olena, Ill.

Dated July 16, 1867. Application for reissue received and filed Nov. 1, 1867.

1st, I claim the frame, a b b and d, in combination with the roller, Q, seat, Y, and tongue, E, constructed and arranged as described and for the purpose set forth.

2d, The levers, T, pivoted to the side of the frame, a b b and d, in combination with the guard, M, and button, Z, constructed and arranged as described and for the purpose set forth.

3d, The semicircular rings, S S, constructed and arranged as described, in connection with the foregoing claims, for the purpose of a ground marker.

4th, The scraper, K, constructed and attached as described and for the purpose set forth,

68,271.—STRAWBERRY TRELLIS.—Wm. W. Wilcox, Middletown, Conn. Dated Aug, 27, 1867. Application for reissue received and filed Nov. 14, 1867.

I claim a trellis, a, made substantially as described, with an upright post or posts, e, and branching arms, c, or their equivalent.

40,226.—LAMP.—Lewis J. Atwood, Waterbury, Coun., assignee by mesne assignments of himself. Dated Oct. 13, 1863. Application for reissue received and filed Nov. 16, 1867.

1st, I claim a draft plate deriving its support from the burner, in combination with a chimney holder below the edges of that draft plate, substantially as set forth, so that the light can shine through the transparent chimney both above and below said draft plate, as specified.

2d, An opening or series of openings between the said draft plate and the interior of the chimney to allow an auxiliary draft to pass to the flame, substantially as set forth.

3d, In combination with said draft plate deriving its support from the burner and the chimney holder below the edges of said draft plate, I claim a perforated air distributor applied substantially as and for the purposes set forth.

4th, The combination of the aforesaid draft plate, chimney holder, and perforated air distributor, with a hinge connecting such chimney holder to the burner, substantially as and for the purposes set forth.

5th, Connecting the said draft plate to the burner by a slide, so that it may be adjusted in position, or removed, substantially as and for the purposes set forth.

68,814.—WATCH.—N. B. Wallace, Fond du Lac, Wis. Dated Sept. 10, 1867, Application for reissue received and filed Nov. 18, 1867.

I claim the two-part cup, F, for the winding post or other axis of a watch movement, substantially as and for the purpose described.

61,986.—MUSKETO BARS FOR WINDOWS, ETC.—Volney Barker, Otisfield, Me. Dated Feb. 12, 1867. Application for reissue received and filed Nov. 20, 1867.

I claim the sockets or corner pieces of a frame, made of metal or other suitable material, substantially as and for the purpose described.

I also claim in combination with the above, the bars, C, provided with grooves for the reception of tongues, w, substantially as and for the purpose set forth.

☞ NOTE.—*The above claims for Reissue are now pending before the Patent Office and will not be officially passed upon until the expiration of* 30 *days from the date of filing the application. All persons who desire to oppose the grant of any of these claims should make immediate application to* MUNN & CO., *Solicitors of Patents, 37 Park Row, N. Y.*

EXTENSION NOTICES.

John B. Holmes, of New York city, having petitioned for the extension of a patent granted to him the 21st day of February, 1854, for an improvement in derricks, for seven years from the expiration of said patent, which takes place on the 21st day of February, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 3d day of February next.

L. Otto P. Meyer, of Newtown, Conn., having petitioned for the extension of a patent granted to him the 28th day of February, 1854, for an improvement in vulcanizing india rubber and other gums, for seven years from the expiration of said patent, which takes place on the 28th day of February, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 10th day of February next.

Sidney S. Turner, of Westboro, Mass., having petitioned for the extension of a patent granted to him the 22d day of August, 1854, and reissued the 25th day of March, 1856, and again reissued the 16th day of May, 1865, for an improvement in sewing machines, for seven years from the expiraton of said patent, which takes place on the 22d day of August, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 15th day of June next.

Inventions Patented in England by Americans.

[Condensed from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

2,705.—COMBINED TUCK CREASER AND SELF-GUIDE OR BASTER, FOR SEWING MACHINES.—Henry W. Fuller and Isaac W. Barnum, New York city. Sept. 25, 1867.

2,850.—DEVICE FOR BUNGING BARRELS OR CASKS.—John Ruigg and Joseph G. Marriott, St. Louis, Mo. Oct. 10, 1867.

2,887.—MACHINERY FOR LOADING HEAVY ORDNANCE.—James B. Eads, St. Louis, Mo. Oct. 14, 1867.

2,888.—REVOLVING BATTERY.—James B. Eads, St. Louis, Mo. Oct. 14, 1867.

2,913.—GOVERNOR FOR STEAM AND OTHER ENGINES.—Reuben K. Huntoon Boston, Mass. Oct, 17, 1867.

2,915.—CHAIR FOR THE USE OF DENTISTS, BARBERS, PHOTOGRAPHERS, ETC.—Otis C. White, Mass. Oct. 17, 1857.

IMPORTANT PATENT CASE.

WOOD AND STRAW PAPER.

Watt & Burgess obtained English Letters Patent, Aug. 19, 1858, for an improved process for making paper from wood by boiling in caustic alkali under pressure. This patent was assigned to Ladd & Keen and by them reissued in two divisions in 1863. Meillier obtained a French patent for making paper from straw by boiling it in caustic alkali under a pressure of seventy pounds. Morris L. Keen obtained two patents for improved boilers for pulping wood and straw. In 1863 the American Wood Paper Company was organized with a capital of $1,000,000, and the Hon. Thos. A. Jenckes, of Rhode Island, as President. This company purchased all these patents and erected extensive works near Philadelphia.

John W. Dixon, of Philadelphia, in 1863, invented an improved process of treating wood and straw to make paper, and an improved boiler for treating these materials. J.D. Heft & Co., at Philadelphia; General Markle, at Pittsburg; the Philadelphia Inquirer Paper Mills, and other large mills, introduced the Dixon apparatus and process.

The American Wood Pulp Company promptly instituted suit against the uses of the Dixon process and apparatus, under all four patents owned by them. The case was argued in final hearing upon an unusual mass of testimony and exhibits, by Hon. Thomas A. Jenckes, of Rhode Island, for the plaintiff, and George Harding, Esq., for the defendant. The bill was finally dismissed, and the injunction asked for refused.

The main points in the case were set forth in the condensed opinion of Mr. Justice Grier, of the Supreme Court of the United States, as follows:

1. That the reissued Watt & Burgess patents of 1863 are illegal and void requires no further reasons than those alleged in the answer, and clearly substantiated by the evidence.

2. Meillier's patent is intended for straw alone.

He was not the first to succeed in this enterprise. His patent must be construed by taking a view of all its parts. He says his invention consists in subjecting straw to a pressure of at least seventy pounds to the square inch—prefers eighty. "I have found by experiments that it is essential that a temperature equivalent to seventy pounds must be employed." The only practical method of determining the temperature of the liquid is by noting the pressure on the boiler.—Testimony of Burgess. Accordingly the patentee describes 70 pounds as synonymous with 310 deg. Fahrenheit. Again, he describes it at 70 to 84 pounds: the claim uses the term not less than 310 Fahrenheit, which he has before defined by 70 pounds to the square inch. The claim of this patent was sustained only against those who went beyond 70 pounds in New York. The process used by defendants does not come up to the minimum claimed by Meillier. The defendants do not use over 60 pounds to the square inch. There is no proof that defendants infringe either of Keen's boiler patents, either of 1859 or 1863. Keen's patent of 1859 is for a combination of devices which is not used by defendants. His patent of 1863 claims a perforated diaphragm of which he was not the inventor. Nor was he the first to use a discharge pipe and valve for the purpose of blowing out or discharging the contents of the boiler under pressure. The arrangement of a discharge-pipe with stop-cock is what every one using a vertical boiler might use without invention, and is not open to be monopolized by Keen.

The combination of devices in defendant Dixon's Patent has more claim to originality and invention than, and does not infringe, either of Keen's patents.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

The clock and watch trade of France, is officially represented as amounting to 35,000,000 francs annually.

Grass valley, in California, is pronounced by Commissioner Brown, the most productive gold quartz mining district in the world. The annual yield of an area drawn by a radius of four miles, is $3,500,000.

The advantage of introducing improved or labor saving machinery is conclusively shown by this fact in the boot and shoe manufacture in this country. In 1860, 123,029 persons produced 70 per cent more than 100,866 persons produced ten years previous, in 1850; or, each person produced 50 per cent more.

At a late meeting of the Lyceum of Natural History of this city, Prof. Chandler exhibited a sample of more than one hundred ounces of native platinum ore from Oregon. Small quantities of valuable ore have from time to time found their way to this city, but this is by far the largest amount ever yet received.

The English cabinet after long consideration of the subject have resolved to place all the telegraph lines of Great Britain under the direction of the Post-Office Department,

Evan's Pass, the highest point between the Atlantic and Pacific oceans—elevation 8,242 feet above tide level—will be reached by the Union Pacific railroad in January. Work on the rock cuttings on the western slope will continue during the winter so that track-laying may be resumed early in the Spring.

There is now a continuous railway communication between Chicago and St. Paul, Minn., a distance of 892 miles.

White ants have proved so destructive to the wooden sleepers of East India railways that government some time since offered a reward of £50 for the discovery of any means for putting an effectual stop upon their ravages. It would naturally be expected that the jarring of the sleepers whenever trains passed them, would of itself drive them from the wood, but the contrary is the case. The timbers have been boiled in poisonous liquids; and have been coal-tarred, but neither operation had the desired effect. In response to the government offer, many plans were presented but the successful competitor has recommended "teak oil." It has been shown that timber coated with this specific, remained untouched after lying for a long time even in the very nests of the white ants.

Illuminating gas is made from Cannel and other foreign coals, the United States with all its immense coal fields, furnishing heretofore no good substitute therefor. From Cameron county, Pa., a new variety of "black diamonds" has recently been brought to market which it is said, has proven itself to possess all the qualities necessary to render it a superior gas coal and render us independent of the imported article. Such a result is sincerely to be desired by every gas consumer, as a reduction in the price would then be brought about.

We have already noted the proposed ship canal across the peninsular of Florida from the Mexican Gulf to the ocean, and now add on the authority of the Fernandina *Courier*, that operations, on this enterprise will be commenced immediately by the Florida and Inland Transportation company the necessary funds for the prosecution and early completion of the undertaking, having been raised in that city and the work having been put under contract. A railroad through the peninsular to Cape Sable, is one other improvement which is called for by the Southern journals. From this point a ferry across to Cuba would not exceed one hundred miles, and the distance from land to land might possibly be reduced to about the distance between Dover and Boulogne. The completion of this road would bring Havana and New York within a hundred miles of each other.

Application has been, or is about to be made in the Parliament of Ontario for a charter for a new railroad between Buffalo and Detroit, on a nearly direct route skirting the North shore of Lake Erie. The distance by the Great Western road between suspension Bridge and Detroit is 324 miles, and from Buffalo to Suspension Bridge 24 miles. The proposed line would be thirty miles shorter than by the Great Western.

The Essen establishment of Krupp's which has existed forty years, now employs 10,000 workmen. Last year 62,500 tuns of cast steel, valued at $7,500,000 left the works. Essen has now delivered 3,500 cast steel guns valued at $5,250,000. The manufacture of the steel production of last year involved a daily consumption of one thousand tuns of coal.

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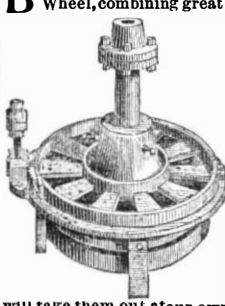

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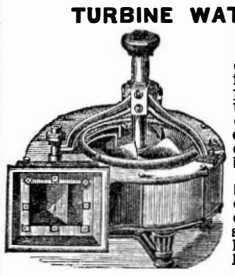

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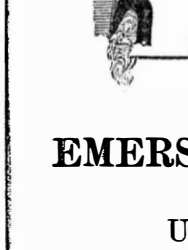

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